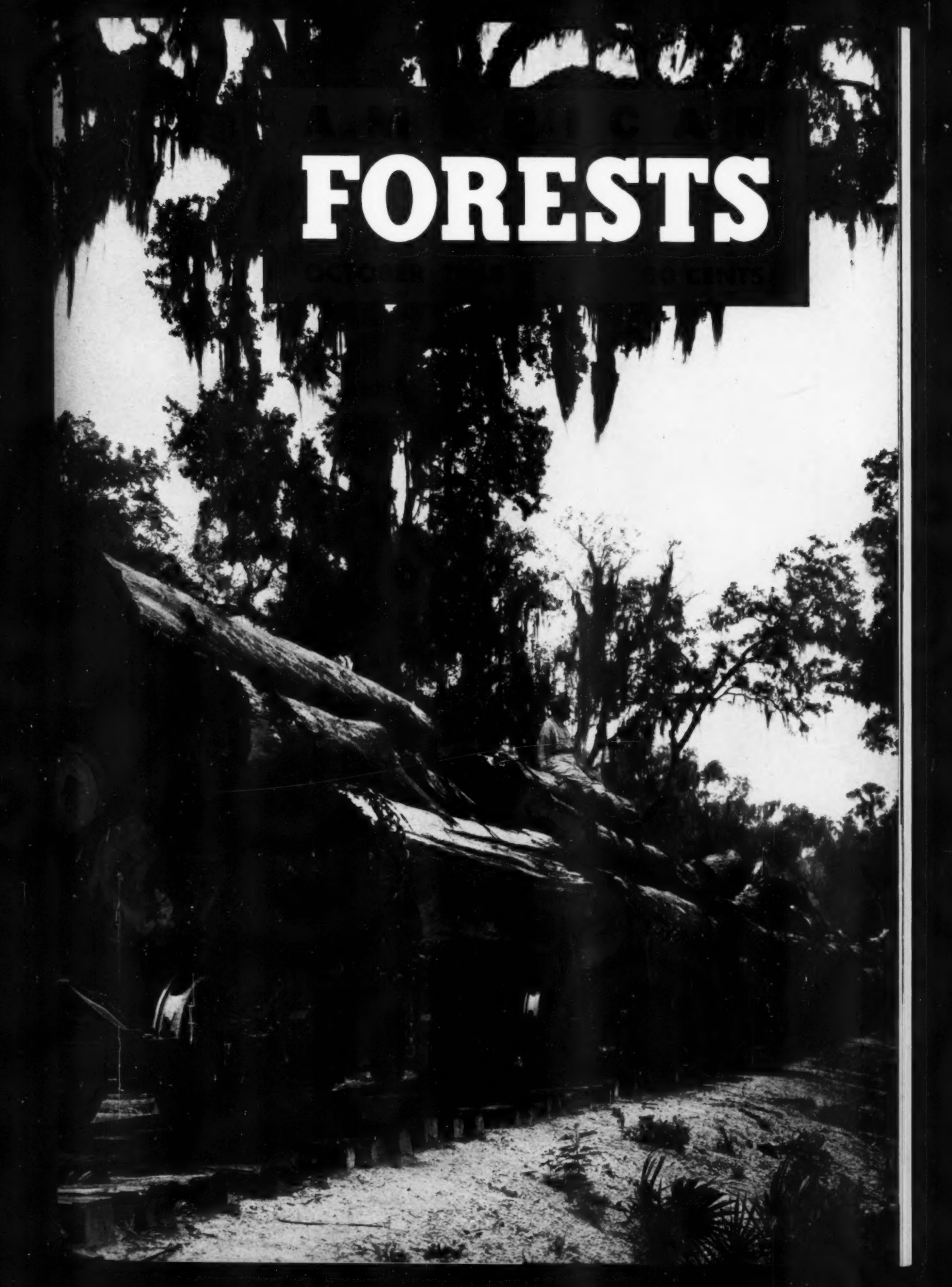
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Photograph by A.F.P.I.

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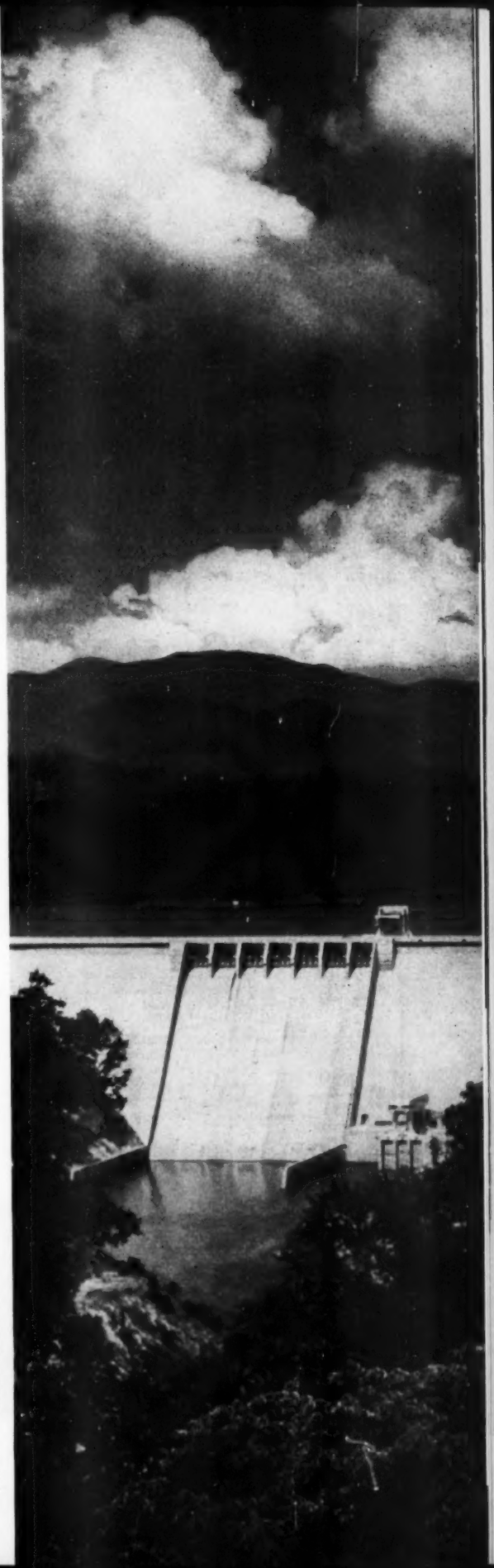
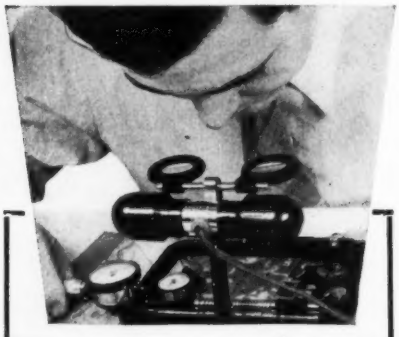


Hiwassee Dam in the Tennessee Valley — Photo by TVA



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UNUSUAL PARTNERS

By Margery C. Carlson

BESIDE a path in a hemlock forest on the south shore of Razorback Lake, near Sayner, Wisconsin, a rare phenomenon may be found. What appears from a distance to be a single tree seems to have half its crown broad-leafed and deciduous and the other half needle-leafed and evergreen. Closer scrutiny, however, shows that the trunks of two trees, a maple and a hemlock, have formed a rare partnership.

At the base, the two trunks are closely appressed and are twined a half turn about each other. Between three and five feet from the ground, the maple trunk has spread out and partially wrapped around the hemlock. Where the spread of the maple is widest the total circumference of the two trees is 42 inches, and of this amount 32 inches are maple and only 10 hemlock. The trunks are separate for about nine inches above the basal union, are then again united for a distance of about a foot, and finally diverge so that the crowns are distinct. The upper union looks like two enormous warts on the two trees which are pushing against each other.

To determine how intimate the union is, I cut out a shallow wedge-shaped piece from the place of contact. How the grain is disturbed at the place of contact is pictured below. The annual rings curve outward and then inward and the maple has produced a fold of wood and bark which is overlapping the hemlock. The bark produced by both trees is occluded and completely separates their wood. I would like to have cut in deeper to see if the bark is present all the way across between the two trees, but I did not want to cause undue injury to them. There is no real union of the tissues of the two trees, and no materials could pass from one tree to the other.

Several examples of the union of trunks or branches of trees are interestingly described and pictured in an article by Henry I. Baldwin in Volume 47 of *Scientific Monthly*. Mr. Baldwin distinguishes between true grafts, in which the tissues of two trees are actually united, and false grafts in which they are closely appressed but remain distinct. True grafts occur only between trees of the same or closely related species. False grafts may occur between different species but are only rarely found between distantly related species. Baldwin pictures one case in which a yellow birth and a hemlock grew in close association. Baldwin's record and the present case are the only accounts of grafts between such widely divergent species as cone bearing and flowering plants which I have found.

L. A. White Photos

A section cut from the trees at point of union *(see above)* showing irregular grain and how bark completely separates their wood

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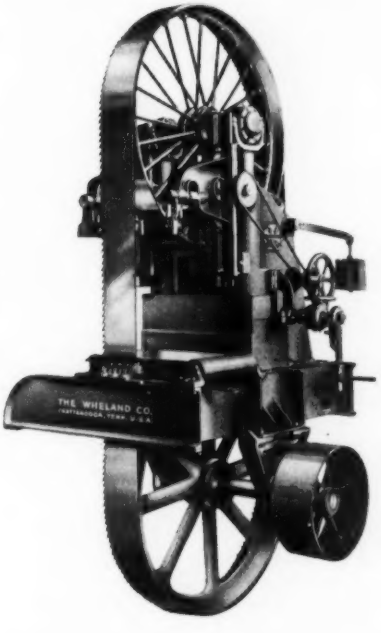

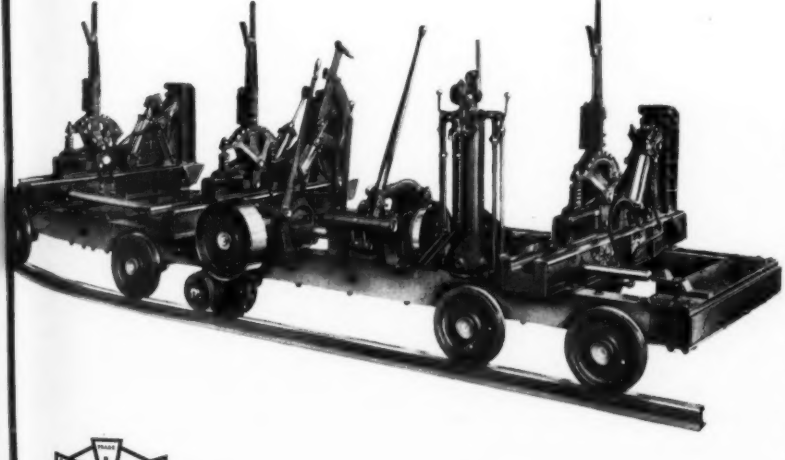

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TRAIL RIDERS OF 1948

A record 197 wilderness enthusiasts participated in the ten expeditions organized this summer by The American Forestry Association for its Trail Riders of the Wilderness. Following is the official roster of the expeditions:

Expedition No. 1—Flathead-Sun River Wilderness, Lewis and Clark National Forest, Montana: Miss Hortense L. Allen, Rochester, Minnesota; Mr. and Mrs. P. A. Bancroft, Bakersfield, California; Miss Yvonne Blumenthal, New York City; Mr. and Mrs. William T. Golden, Washington, D. C.; Miss Vicky Krider, Middlebury, Indiana; Mr. and Mrs. Paul Lostetter, Minneapolis, Minnesota; Mr. and Mrs. D. W. Murphy, Piedmont, California; George J. Openhym, Orange, Connecticut; and Miss Dorothy Proeber, Milwaukee, Wisconsin.

Expedition No. 2—Flat Tops Wilderness, White River National Forest, Colorado: Miss Mary L. Dyar, Minneapolis, Minnesota; Miss Betty L. Engebretson, Minneapolis, Minnesota; Miss Hazel Houston, New York City; Miss Nanna Jelstrup, Morris, Minnesota; Miss Carolyn Partain, Merion Station, Pennsylvania; Miss Geraldine Smith, New York City; Miss Eugenia Spriestersbach, Western College, Oxford, Ohio; Hugh J. Tenbusch, Grosse Pointe, Michigan; and Louis Weickum, Astoria, L. I., New York.

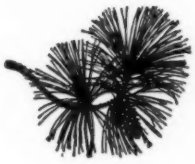
Expedition No. 3—Flathead-Sun River Wilderness, Lewis and Clark National Forest, Montana: Miss Yvonne Blumenthal, New York City; Miss Eleanor Broadhead, Salem, Massachusetts; Miss Clair Chapin, Winnetka, Illinois; Miss Dorothy Decker, Santa Ana, California; Miss Genevieve Humiston, Santa Ana, California; Maurice M. Jackson, Chicago, Illinois; Leon M. Levy, Scranton, Pennsylvania; Mr. and Mrs. Arthur E. Mallory, Hampton, Iowa; Miss Alice E. Meader, Detroit, Michigan; Robert S. Merriman, Bristol, Connecticut; Miss Henriette Moed, New York City; Ernest S. Reese, Madison, Wisconsin; Miss Sibyl D. Reese, Madison, Wisconsin; Oscar Ben Rosenblum, Sharon, Pennsylvania; E. V. Sundt, Wilmette, Illinois; Miss Joyce Sundt, Wilmette, Illinois; Mrs. Joseph Tanner, Layton, Utah; and Dr. Jacob J. Weinstein, Chicago, Illinois.

Expedition No. 4—Flat Tops Wilderness, White River National Forest, Colorado: Miss Eleanor Florance, Cleveland, Ohio; Miss Ruth Goppelt, Milwaukee, Wisconsin; Miss Ruth R. Harmon, Madison, Wisconsin; Miss Betty M. Jordan, West Bend, Wisconsin; Mrs. Edgar E. Quayle, Washington, D. C.; Miss Mary Ellen Quayle, Washington, D. C.; Floyd L. Randel, Wichita Falls, Texas; J. L. Randel, Wichita Falls, Texas; Dr. and Mrs. J. B. Seeley, Dearborn, Michigan; Robert I. Snajdr, Cleveland, Ohio; and Miss Dorothy A. Wachs, Milwaukee, Wisconsin.

Expedition No. 5—Sawtooth Wilderness, Sawtooth and Boise National Forests, Idaho: Dr. and Mrs. James A. Barr, Piedmont, California; Mrs. T. A. Box, Altadena, California; Miss Lizbeth Box, Altadena, California; John A. Brabson, Florence, Alabama; Lloyd D. Hanford, San Francisco, California; Lloyd D. Hanford, Jr., San Francisco, California; Miss Ruth Krauss, New York City; Mr. and Mrs. Sidney Liebes, Woodside, California; Lloyd Liebes, Woodside, California; Sidney Liebes, Jr., Woodside, California; Stephen Liebes, Woodside, California; Mrs. Douglas E. Nash, Darien, Connecticut; Miss Loula May Rodriguez, New York City; Miss Lee Serbousek, Cedar Rapids, Iowa; Miss Olga Serbousek, Cedar Rapids, Iowa; Mr. and Mrs. Leslie J. Smith, Chicago, Illinois; Miss Miriam H. Stein, New York City; Mrs. Mary M. Storm, Chicago, Illinois; Miss Katherine Turzyn, Jersey City, New Jersey; Miss Eleanor E. Waldo, Chicago, Illinois; Miss Pauline Whitaker, Minneapolis, Minnesota; and Dr. Arthur E. Woolsey, Marlboro, New Jersey.

Expedition No. 6—Maroon Bells-Snowmass Wilderness, White River National Forest, Colorado: Ferg Alleman, Orlando, Florida; Mr. and Mrs. C. E. Aubel, Manhattan, Kansas; Miss Mary Ellen Brickner, Arvada, Colorado; Dr. Nancy L. R. Bucher, Boston, Massachusetts; Miss Barbara Clarke, Chicago, Illinois; Miss Florence Clement, South Hadley, Massachusetts; Miss Eileen Carol Dean, Oakland, California; Mr. and Mrs. Ervin R. Edgcomb, Philadelphia, Pennsylvania; Miss Elizabeth Falconer, Shaker Heights, Ohio; John Ferguson, Baltimore, Maryland; Mrs. John F. S. Fletcher, Dimock, Pennsylvania; Mr. and Mrs. Lewis Harriton, New York City; Fred E. Heilman, St. Louis, Missouri; Har-

(*Turn to page* 464)



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Editorial

Conservation's Great Need

IN a major political campaign, such as is now engulfing the nation, it is an old American custom for aspiring candidates to dwell at length on "what this country needs." Many readers will recall less perilous days when it was "a good five-cent cigar," or "a chicken in every pot, two cars in every garage." Unhappily, we can't be so poetic about it now. The shadow of new peril that is spreading over the ruins of Europe and Asia is too deep. It is no longer a matter of individual prosperity—it is a matter of national survival.

To anyone who will think the matter through, it should be obvious that what this country needs today if it is to exist as a great democracy—what the world needs, in fact—is realistic natural resource conservation. We should make no mistake about it, our destiny tomorrow rests largely upon what we do with our resources today.

This truth may or may not have escaped the politicians in the current campaign, but up to the time of going to press they have been conspicuously quiet about it. On the other hand, there is increasing evidence that the American people are becoming more and more conservation-minded. Witness, for example, the unprecedented success of two recent books that probe to the very core of our resource situation, *Our Plundered Planet,* by Fairfield Osborn, and *Road to Survival,* by William Vogt, the latter a Book-of-the-Month selection. This suggests that perhaps the people are far ahead of their political leaders in conservation thinking.

Whether or not this is true remains to be seen. But what is equally important is whether the present conservation effort is keeping pace with mounting public interest. There is some indication that it is not. Milton Eisenhower, president of Kansas State College of Agriculture and Applied Science, as has been brought out in a previous issue, makes a point that only ten cents of the conservation dollar is being spent effectively. And, whether we like to admit it or not, it is a fact nevertheless that conservation's greatest needs—teamwork, salesmanship and individual initiative—are being largely ignored while new financial and legislative headaches are added to an already staggering conservation pattern.

The net result is that the overall effort lacks coordination. There are too many lone-wolf conservation agencies and organizations, some of which have built fences around themselves with a stay-on-your-side-of-the-street attitude. In some cases these protective fences have been erected in the spirit of self-preservation, for conservation also has its eager beavers who are continually seeking to encroach and absorb. Whatever the reason, this duplication of effort, or the lack of it, is raising conservation costs while decreasing its effectiveness. The maladjusted machinery must eventually be corrected through legislative procedure, but much of it can be made to function more effectively through teamwork.

World conditions underscore the urgency of prompt action to demonstrate that the free enterprise system can make the lands of the nation contribute their maximum to American life. This will require a willingness of all conservation agencies and groups to develop a practical working alliance on the part of the public, the landowner and state and federal governments. It has to be teamwork all the way.

Assuming unity of action, another step is to unleash the power of education to sell conservation to the people through every possible avenue of approach, but planned and guided to stimulate individual initiative to correct poor land management practices. The direction of educational programs must be placed in the hands of those who know salesmanship as well as technical conservation theories. Too little emphasis has been placed on human relations in training and hiring conservation specialists. Technical "know-how" is important—but the ability to sell it to others, particularly forest landowners, is equally so.

To be effective, education should deal with well-organized facts impartially presented and channeled to the people in ways that will arouse enlightened interest and action. This means careful planning, with consideration given all factors—causes, economics and people. It should be localized and greatly implemented with demonstrations and service.

Federal and state governments can exercise leadership with vigor and success only as long as their programs have the lasting and informed support of the people. By the same token, owners and operators of forest properties sooner or later are subject to the dictates of public opinion. If the free enterprise system of solving our forest and other conservation problems is still as potent and competent as the American people believe, action through teamwork, education and individual initiative must succeed in restoring our nation to a position of natural resource plenty.

"Autumn Advances on Fallen Leaves"
Photograph by John Kabel

WALCHEREN

AN EPIC OF THE SOIL

By EDWARD N. MUNNS

PERHAPS every American has heard the story of Hans, the little Dutch boy who stuck his finger into a hole in the dike and saved his village. I've heard it many times. But never have I enjoyed it more than when it was told, with variations, by a grizzled old Dutchman on the island of Walcheren, in Zeeland. It was here, I was assured, the incident really occurred.

We were sitting on a dike at the time, in the shade of a pile of wire netting. On one side of us was the uneasy sea, slashing against the stones, trying to find another hole in the wall. On the other was the Dutch landscape, lazily quiet and peaceful under the summer sky. I asked the old man about this for it did not look like a typical Dutch landscape as I knew it. There were no ungainly-looking windmills with their broad sweeps turning lazily in the breeze. There were no old houses, weather-stained by winter storm or summer sun. There was no great expanse of pasture with fat cattle grazing contentedly.

Instead there were new temporary houses and sheds, the mortar between the bricks still white, the unpainted woodwork yellow as it came from the

When the sea came smashing through the bombed dike at Westkapelle on Walcheren Island
Photo Pictorial Press, London

saw, the thatched roofs still bright and untarnished by the elements. The fields were green, but instead of a heavy growth of alfalfa or clover. they showed only sparse stands of rye, beets, or potatoes. Here and there great patches of earth showed through, yellow or white—not black as it should have been. In places were large areas of shallow water, the ponds surrounded by great mud flats and flowering weeds. Deeply cut creeks meandered through land that once had been in regular polders. There were dead trees and bushes.

The old man watched me with interest for a full minute before launching upon the story of Walcheren—a tale much different from that of Hans, but nonetheless absorbing.

Zeeland, "the land taken from the sea," is one of the important states or provinces of the Netherlands. It is made up mainly of perhaps a dozen islands, large and small, in the estuary of the Rhine and Schelde rivers. Centuries ago as the glaciers which covered northern Europe retreated, these two rivers brought down huge quantities of gravel and sand to the Atlantic. Here the waves and tides had sorted and shifted this material until it became stabilized as a great shelf out in the North Sea. As the water became increasingly shallower, off-shore dunes appeared, in the lee of which the finer soil material was gradually deposited.

Decade after decade, these deposits thickened until finally mud flats became exposed at low tide. Then the hardy Hollander, desperately in need of rich ground, built an embankment around the highest points. By connecting up this dike with the dunes, he was able to shut out the sea. He built windmills to pump the water from the land and dug many ditches to drain it. Thus the islands of Zeeland, the most westerly part of the Netherlands, were formed. Until the country undertook the reclamation of the Zuider Zee in the north, this was the youngest part of Holland, though centuries old.

Walcheren, one of the larger of the group of islands, lies about thirty miles from the mainland. One hardly realizes that it is an island as he crosses two short bridges, the first of which connects the island of Breveland with the mainland, and the second links Breveland to Walcheren. It is somewhat circular and about twelve miles in diameter. Its importance is attested by the fact that Middleburg, in the center of the island, is the capital of Zeeland. Here one finds buildings dating back 500 or more years and reflecting the influence of the old coastal trade. More widely known is Vissingen—Flushing, the English call it—because of the beautiful costumes which the people wear on occasions.

Official Netherlands Photo

This is what happened to little farms on Walcheren Island when the island was inundated to thwart the Nazi intruders

Walcheren, too, was noted throughout Holland. Here were some of the very richest and finest soils in all the Netherlands. Lush pastures, fine cattle, and always abundant crops made each polder a valuable asset. Indeed, Walcheren folks felt themselves superior to those of the mainland who had to work so much harder to make a living from the sandy soils.

Unfortunately, Walcheren is strategically located. It overlooks the deep-water channel that leads into the Schelde River and the port of Antwerp. It juts far out into the North Sea. Consequently, when Holland was overrun by the Germans in the early days of World War II, the island was quickly occupied and fortified. To safeguard their position, the Nazis destroyed many of the pumps that kept the island dry. As a result, all

Once again the doughty Dutch are restoring their land in the wake of war. This story is a closeup of the cleanup on Walcheren Island

the lower portions of the island were inundated by the accumulations of rain water and seepage. Middleburg was on high ground and was surrounded by dikes.

During the war Walcheren twice got into the headlines; first, when the British and Canadians attempted a naval landing on the island. The second was in October 1944, when the Royal Air Force successfully bombed the dikes. In this effort the dikes were breached in two places on opposite sides of the island. As the ocean poured in, the German defenses were drowned out, permitting the Allies to recapture Antwerp and to make possible the invasion of Holland. Strangely though, few Dutchmen were caught in the flood. Somehow, just before the bombing, the local people had gone visiting on the mainland or had gathered for a social evening on the highest parts of the island above the onrushing water.

The break in the dikes, however, created an unforeseen situation. Two great tidal creeks were formed at the breaks. As the waters poured onto the island at high tide, they were from twenty to fifty feet across and from ten to fifteen feet deep. The currents extended several miles inland before the force of the water was dissipated. At low tide the current reversed itself and the water flowed out to the sea again. Because of the location of the breaks and the manner in which the tides rose and fell, the Dutch estimated that five billion gallons of water entered at high tide at one of the breaks, but only two billion gallons ran out. On the other side of the island about three billion gallons flowed in and six billion poured out at low tide.

Twice each day the creeks reversed their direction. As the waters rolled back and forth homes were caught and crumbled in the waves. Picturesque windmills with their long sweeping arms toppled into the water. Property markers were obliterated. Identifying features of the landscape were completely erased. The salt in the sea water killed trees, shrubs and vegetation. The only vegetation that survived was on the dunes, on some of the cross dikes, or on the very highest parts of the island that were above sea level.

Back and forth the tides flowed. The loose, porous topsoil built up by centuries of deposition and enriched by the careful husbandry of the thrifty Dutch, was sluiced first one way and then another. Lighter than the sand, much of this fertile soil was washed out to sea by the tidal streams that entered the breaks. Great areas of glacial material, buried under heavy silt, deposited feet thick on once fertile farms. Small dunes developed. The vast network of drainage canals and ditches were erased. Some of the interior levees and dikes, built with patient effort over long years, were engulfed. Walcheren was no longer an island; it had become a tidal basin. Here and there a mound of bricks denoted a home. A high point of land marked the site of a cross-levee.

When the war ended, Walcheren had again to be reclaimed. First the breaks in the dikes had to be closed. Breakwaters were built to reduce wave action. Barges loaded with ammunition and other war material were sunk in the breaches. Great guns, tanks, radio towers, and barbed wire were thrown on top. Dredges pumped in gravel from the sea bottom and bulldozers and steam shovels pushed in thousands of cubic yards of dune sand. Huge blocks of granite, feet thick and weighing many tons, were brought from the Belgian quarries to anchor this loose material in place despite the angry sea. Finally, after nearly two years of heartbreaking effort during which failure repeatedly stared them in the face, the Hollanders closed the breaks again; the fight against the sea was won.

Even though the gaps were closed, the Dutch did not feel safe. The barricade was too weak, too loosely built. Additional sand from nearby dunes was brought in until the sea wall was fifty or more feet above high tide. Then the seaward face was further paved with immense jagged blocks of Belgian basalt, many feet square. These were carefully laid in place on top of a heavy woven wire matting which was deeply anchored well off shore and many feet below low tide. The pavement extended from far below the ebb tide to several feet above high tide. Old railroad rails and structural steel were driven in among the blocks to form a picket fence against the sea. Against this mass of interlocked rock and steel the tides could lap impotently.

Just above the paving, row after row of long piles were driven deeply into the sand. Many of these pine logs were full of pitch and showed the long scars of the French system of turpentining. The piles were about ten feet apart each way. Parallel to the sea, planks were nailed to form a tight barrier. As this fencing proceeded up the slope, the several rows of piling were tied together with wire

Stuffing bundles of willow reeds into a leak behind new sea wall in Walcheren

Photo by Black Star

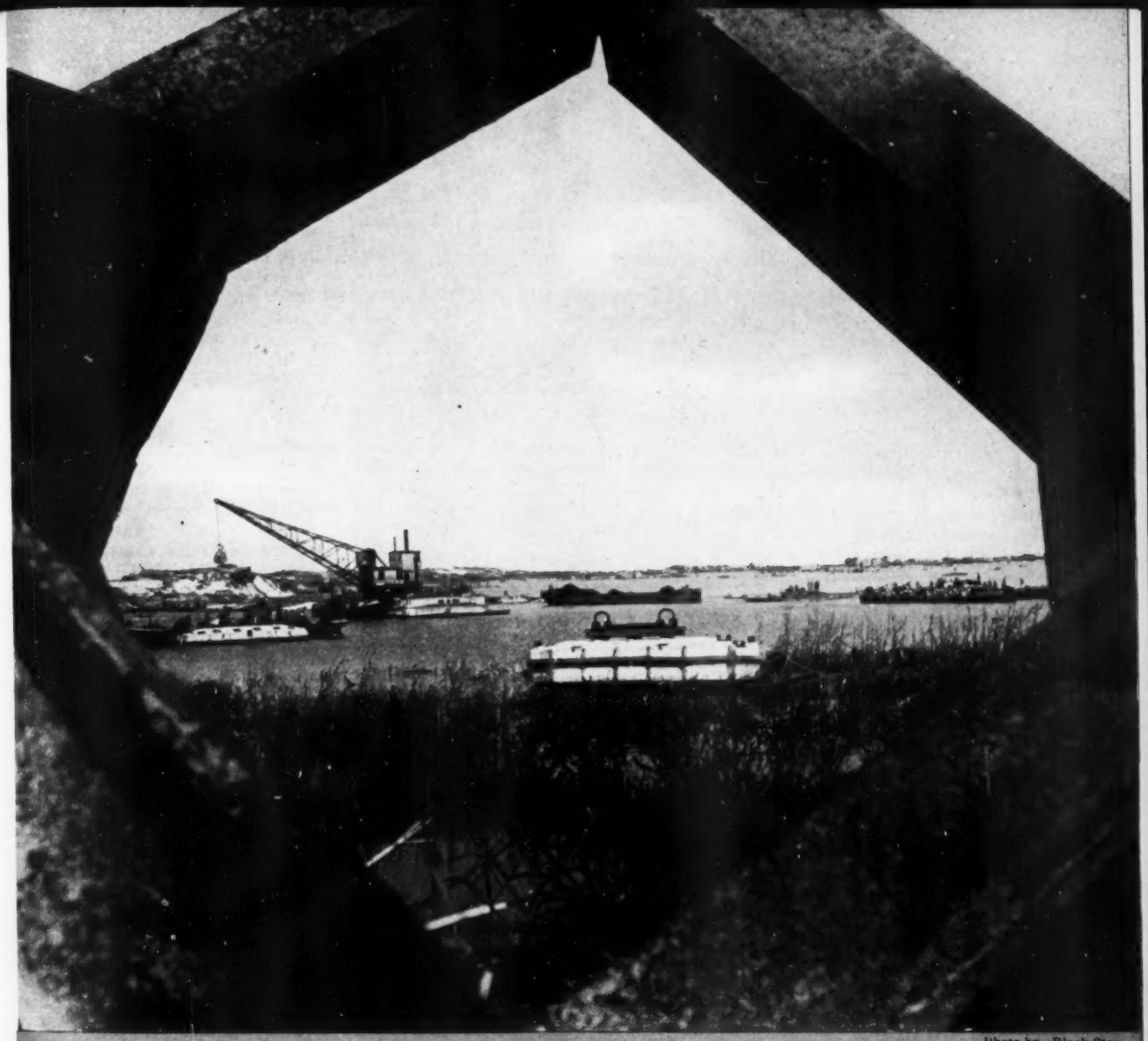

Photo by Black Star

Through the frame of a German tank trap, the last act in plugging the dike gap is seen. A German barge, built for the invasion of England, is about to be sunk and covered with rocks

rope which ran back and forth and criss-cross to bind each row firmly to its neighbor. The space between the pile-fencing was then filled in with broken rock fragments, steel netting and sand until only the very tips of the piles showed.

Further up the slope and just about the limit of the salt spray, more rows of piling were placed, only this time the poles were smaller and shorter. Woven wire was nailed to them and again the interlacing of the wire cable bound the rows of piling together. Into the wire fencing, willow and poplar cuttings four to eight feet long were laced, green branches and twigs filling in the chinks. As the fence was finished, pine straw from the dune forest and sand were thrown in by a gang of teenage boys and girls, burying the fence until only the tops of the cuttings showed. Many of these were expected to sprout to form a living fence.

Then between the rows of cuttings girls planted clumps of grass. The spacing was irregular and most uneven—but the old man explained that the winds were sometimes very strong. When the plantings were uneven, the wind could not so easily start the sand to blow.

As the planting was finished, boys brought pine boughs and scattered them over the grass. This, too, was to help the grass to become established and to prevent sand movement until it had taken hold.

Above the grass border, perhaps twenty feet farther up the slope, boys and girls were pushing two-foot long willow and poplar cuttings into the sand. It was evident that it was not expected that the rows would be neat and straight, for as the youngsters worked, the rows had a tendency to come together. Every once in a while the overseer straightened the rows in a more orderly fashion. When I inquired why they didn't require straighter rows, the old Dutchman smiled and said, "The wind does not like crooked rows and uneven stands. We shall plant pines everywhere next spring, both here where the break was made and on the dunes. They will be close together at the top of

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FORESTS RETURN TO THE PESHTIGO

Along this river of historic tragedy, where in 1871 swept the most calamitous forest fire in American history, a unique land-use program is progressing, largely through the efforts of a forward-looking lumberman and a forestry-minded county agricultural agent

By FRED B. TRENK

THE Peshtigo is a Wisconsin river which Marinette County can claim for its own. It is a river of historic tragedy — where 1,500 people perished in 1871 in a forest fire that swept over 1,280,000 acres — and of present-day charm. Burden carrier when Wisconsin's pineries moved millward, it now is the harnessed water-slave in the era of electro-turbines. Yet, not all of its rapids are harnessed, and if Marinette's citizens of tomorrow keep faith with the vision of its leaders of today, two never shall be.

Each of these rapids is in a county park and each park is dedicated to a citizen known for his zeal for Marinette County forests. One is the Robert B. Goodman Park — the other the Charles B. Drewry Park. Both men are living; both have experienced that warmth of feeling which comes from acclaim bestowed by grateful fellow citizens. One is an industrialist—the other a retired public servant. One saw the urgent need of restrained use of the forest resource; the other was assigned the task of restoring fire-scarred lands. Combined, their efforts have made of Marinette County's forests a source of sustained income to labor and to county government.

Robert Goodman, virtually alone among the operators of large sawmills in Wisconsin in the years of falling farm prices following World War I, recognized the slogan "the plow will soon follow the ax" for the mockery it truly was. As a sawmill operator he preferred to stay in the lumber business. And, to him, these basic facts needed to be reckoned with and acted upon: there was timberland in Marinette County suitable only for the growing of timber; and there was something wholly unsound in a tax system that forced the owner of timberland to cut faster than the assessor could make out new assessments.

He had no small part in setting in motion forces that resulted in the enactment of Wisconsin's forest crop law. This provided a dual form of taxation—an annual tax on the land and a separate tax on timber when, and only when, it produced income.

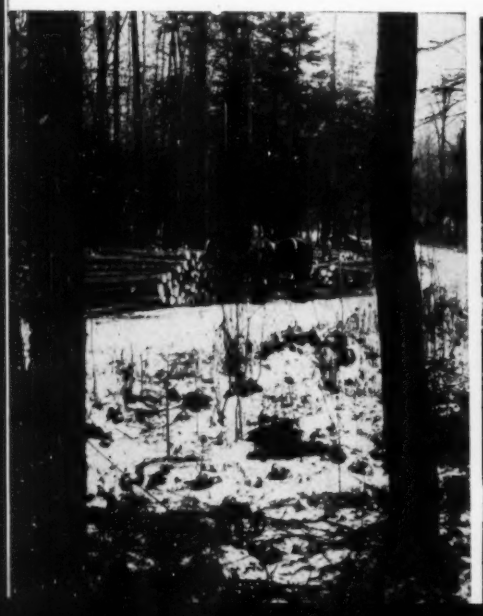
Mr. Goodman made use of this law —and not without abuse for his frugality. Yet during the twenty years the law has been in force some of the largest bandmills in the state have hauled the last log up the jack ladder, shunted the last flitch through the resaw. Thunder Lake, Rib Lake, Bay Shore, Heineman, Rusk Owen, Hines, Hatton, Holt are the names of a few of the mills recently closed. Once they converted a good part of Wisconsin's timber into lumber. Today they are only memories.

But the thriving sawmill town of Goodman carries on—and its millhand citizens are no more fearful of the future than the rest of us in this era of unbridled atomic power.

Mr. Goodman's vision and leadership did not go unrecognized. He served six years on the Wisconsin Conservation Commission, five as its chairman. And he was given an honorary doctorate from the School of Forestry at Yale University.

But mark well that forest crop law which Robert Goodman championed.

At left, pulpwood decked in a Marinette County forest—twenty years ago this land forfeited to the county for taxes. At right, the Peshtigo River as it appears today in Drewry Park



It is the cornerstone of a permanent forest industry in Wisconsin. Without it the achievements of Charles Drewry and the county committees he served would not have been possible. With it Marinette and some twenty-five other counties have been able to lay the groundwork of a new forest enterprise. It is the common denominator in forest conservation and forest restoration.

When a county becomes the unwilling owner of a half million acres of land, or approximately half of its total acreage, through the processes of tax forfeiture, the remaining taxpayers pay dearly. Between 1925 and 1940, Marinette County had taken title to this large area. Could such adversity be turned to the ultimate financial advantage of the whole county? It could—and it was. If forest stripping meant ghost towns and stranded settlers, could forest restoration bring new industries and stable income in something less than a generation? It could—and it did.

Let it be said to the credit of those who framed the original Smith-Lever law, which provided for our national system of county agricultural agents, and of those who administered the law, that agricultural extension was visualized as something greater than making two blades of grass grow where one grew before. At no time and at no place before World War II was the over-all usefulness of the law put to so gruelling a test as in the cutover areas of Wisconsin in the agricultural decline of the late twenties and early thirties. What happened to farm values then is a story that needs no retelling here. In the more advanced agricultural areas farm economy was rocked to its very foundations. In the newer communities the stability of local government itself was shaken.

Had agricultural extension, as administered by the land grant colleges, an obligation to the farmer and frontier settlers whose economy was threatened not alone by falling prices but also by a rising tax burden? Marinette County was one of the first to put that question to their College of Agriculture, and in 1928 there began that pattern of "analysis-followed-by-action," which brought order out of chaos for the state's cutover counties. As the county agricultural agent, Charles Drewry was on the front line from the start. As their dual employee he spoke for both the county and the college. Fortunately his fellow board members on county land and forestry demonstrated qualities of true statesmanship.

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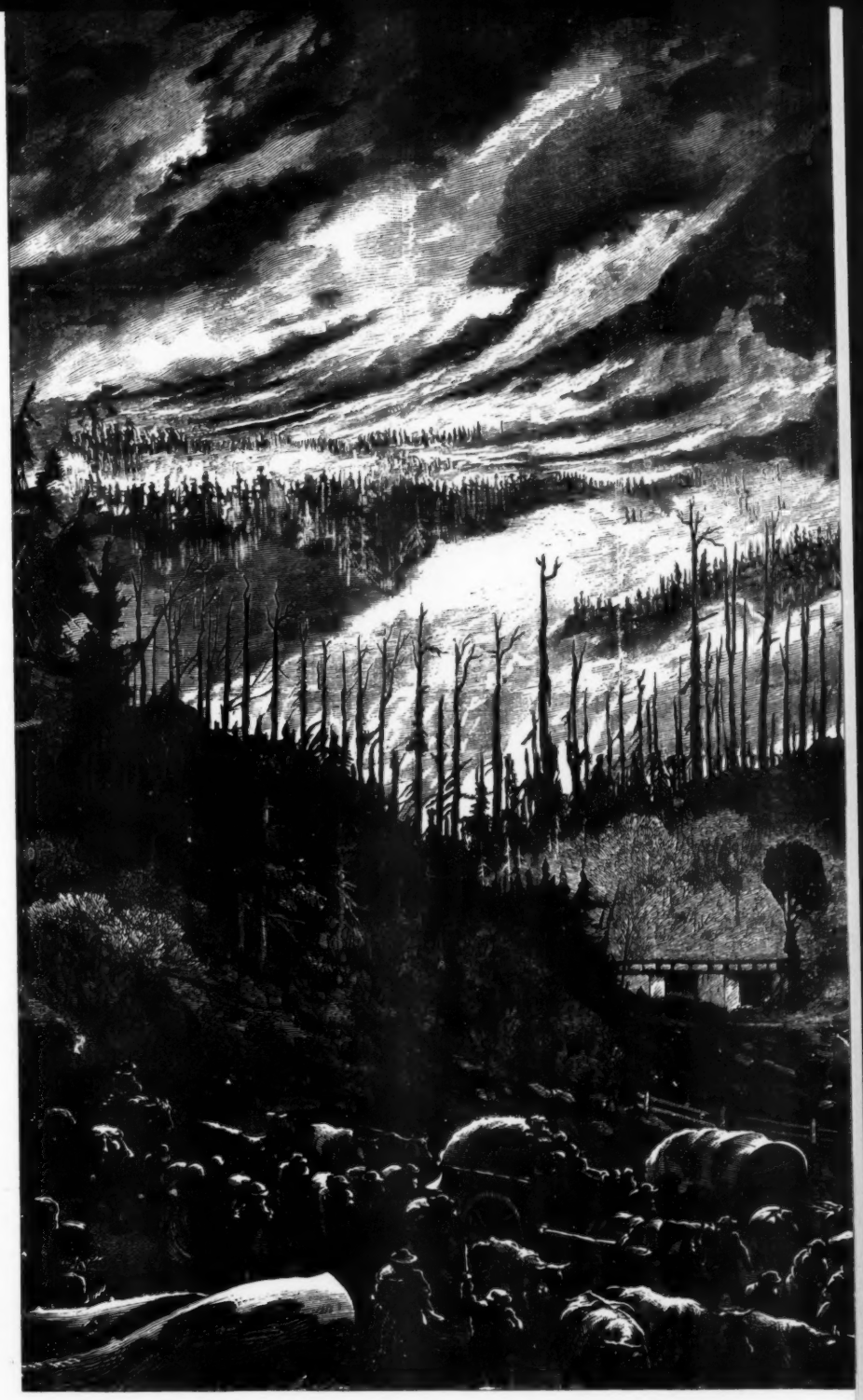
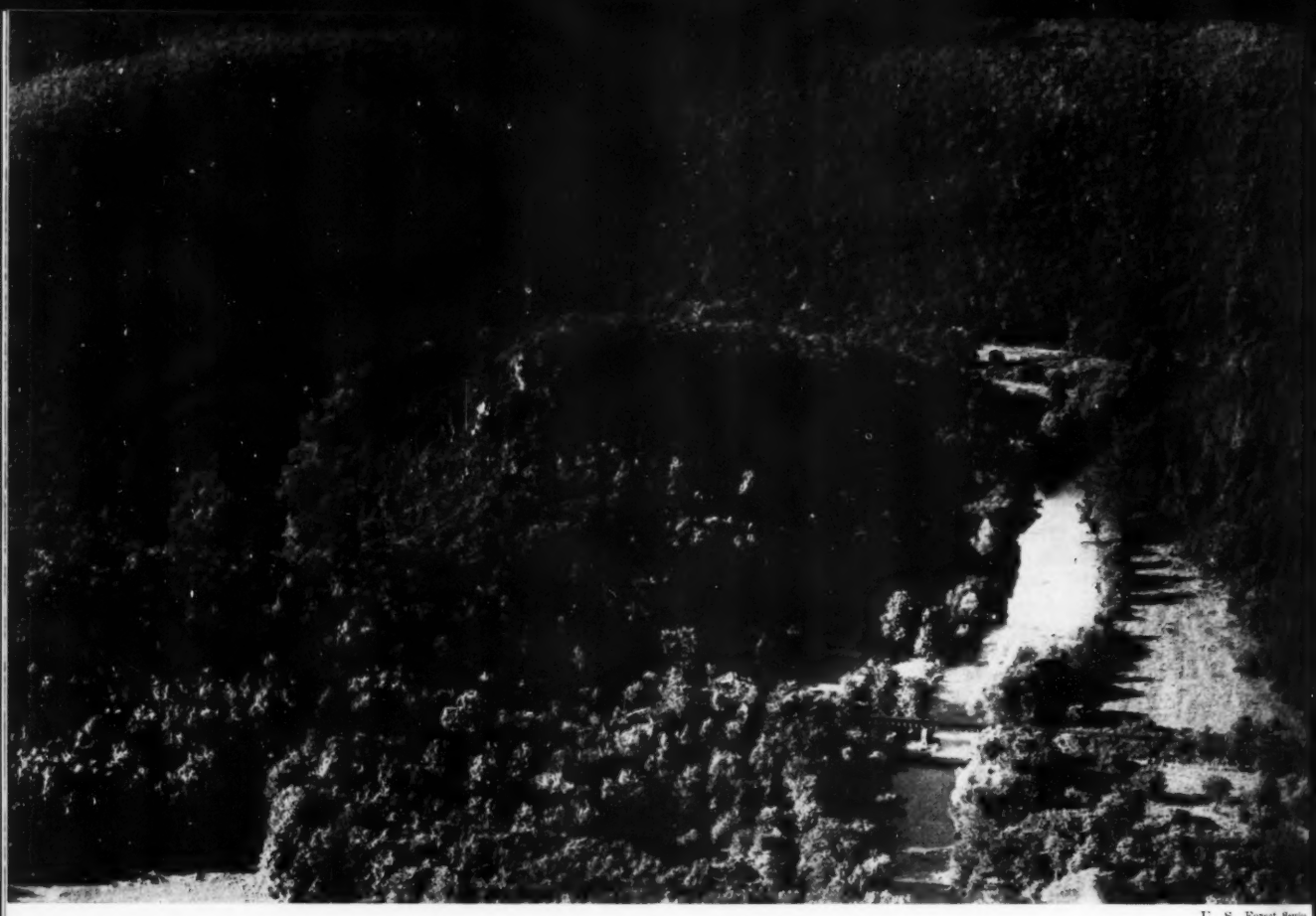


The most calamitous forest fire in the history of the country, the tragic Peshtigo fire in Wisconsin in the fall of 1871—it began on October 8, the same day as the great Chicago fire—claimed 1,500 lives and two billion pine trees, while burning over 1,280,000 acres. No ordinary fire, it swept down on Peshtigo faster than sound—the whole town was ablaze in five minutes—catching people in their tracks and turning them into burning flares. One of the most accurate descriptions of what happened appeared in an article accompany this rare old cut of the tragedy in Harper's Weekly for December 2, 1871: "Almost instantaneously there seemed to be a perfect rain of fire, from which escape was almost impossible, the sparks falling thick and fast as drifting snow. . . .'



U. S. Forest Service

RAILROADS HAVE A STAKE IN FORESTRY

It adds up to hauling more than two million carloads of forest products last year—to an annual need of forty million crossties and two and a half billion feet of lumber

By O. K. QUIVEY

THE railroads of America have a very definite stake in forestry. Summarized in words it adds up to adequate timber supply for self-use, future traffic in forest products and protection to rights-of-way by better control of excessive runoff of surface waters. Figures present a more graphic story. According to the Association of American Railroads, the railroads of the nation last year used nearly two and a half billion board feet of lumber for maintenance work, bridges, boxcars and other purposes; they required forty million crossties; and two and a half million cars loaded with forest products — around eighty million tons — brought the railroads revenue in excess of $456,000,000.

The consumption of forest products by the railroads, as in the case of other industries, fluctuates to a great extent, according to economic conditions. However, the railroads generally maintain their position as the principal consumer of treated timber, railroad crossties having always comprised the great bulk of wood subjected to preservative treatment.

While around 2,500 patents have been granted substitutes for wooden ties, thus far not one has proved satisfactory. The resiliency of wood makes it more desirable for railroad ties than any substitute material yet found. No other material can so well take the shock and stress of rolling stock. In case of derailment and equipment dragging, a wooden tie will resist destructive action to much greater extent than ties of substitute material. And the wooden tie offers the most satisfactory method of fastening rails to the ties.

Then there is the element of cost. The wooden tie is less costly than the proposed substitutes. A wooden tie, properly treated and properly cared for, will have a longer life than any form of substitute tie of which we have knowledge.

Preservative treatment, together with better mechanical protective methods employed by the railroads, has resulted in increasing the life level of crossties from eight to twenty-five years. Thus, Class I railroads of this country, instead of requiring

THE AUTHOR, manager of agricultural development for the B. & O. Railroad, is past president of the American Railway Development Association.

from forty to forty-five million crossties in 1948 might, without these practices, have required up to eighty million ties.

While this represents a savings to the railroads, it also lessens the present heavy drain on the country's timber stockpile. Railroad executives and their aids are well aware of the desirability of this from a conservation standpoint. They are aware, too, that constructive forest management is the best guarantee they have to a continuing supply of timber adequate to their needs. It is conceivable that, if necessary, the railroads eventually may elect to pay a premium for forest products that are harvested in such manner as to keep the land planted to trees and in good growing condition.

A nationally-known distributor of forest products with which many of the railroads contract for ties, poles, piles and lumber has its various logging areas earmarked for operations in 1950, 1975, 2000, 2025 and 2050, after which the cycle begins all over again. Thus, each area is maintained on a sustained-yield basis. Trees are harvested when mature and the land reforested. The Class I railroads represent probably the major customer of this great forward-looking organization.

Despite the fact that forest products represent a considerable item of freight revenue for the railroads—$456,325,000 last year, or six and a half percent of the revenue for all commodities—the railroads' first interest in forest products is from a self-use standpoint, their own supply of crossties, lumber, poles, piles, etc.

Obviously, the nationwide trend toward an alerted forest conservation and reforestation program is gratifying to the railroads. Many have heartily endorsed forestry programs. Some have instituted perpetual yield-management plans to insure their roads a timber crop for many years to come. One railroad has established a demonstration forest which is to be self-sustaining. Modern harvesting plans will show the people in the area the practicability of good forest management. Still another railroad owns and operates one of the largest tree farms in the West.

Impressive is the fact that many major railroad systems could be saved hundreds of thousands of dollars annually in reconstruction and repair of their rights-of-way if the normal runoff or surface waters from denuded adjacent hillsides or uplands were held where they fell—that is, controlled by reforestation. Young plantings a few years old will often do the trick without the necessity of plantings growing into mature trees.

Water is the major requirement in industrial plant location and operation. Often it is the determining factor in the selection of a plant site. Labor, raw materials, power, coal, gas and so on can be brought to the industrial plant, but water must be "on the spot." Frequently, industries have by-passed localities as sites for their plants principally because of the insufficiency of water, and have selected those areas where water is present. In other cases, industries have migrated on account of the depletion of water supplies. Thus the railroads' stake in America's forests is further indicated, since an ample ground water supply is made more dependable by well-managed forests.

So important is the railroads' stake in America's forests that the number

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Crossties, part of the forty million used by the railroads last year, ready for creosoting at the Koppers Company in Illinois
W. H. Shaffer, USFS

WHY RAILROADS HAVE A STAKE IN FORESTRY

Two and a half million boxcars and flatcars loaded with forest products were hauled over American railroads last year. That represents a lot of freight—87,027,536 tons, to be exact.

The total freight tonnage originated by the railroads was 36,966,971 carloads, or 1,514,984,000 tons. This heavy tonnage explains why railroad maintenance crews last year found it necessary to replace 40,205,000 of the 992,648,000 crossties in all lines from Maine to California. Switch and bridge ties consumed 135,000,000 board feet of lumber.

In all, American railroads last year used 2,326,000,000 board feet of lumber—for maintenance work, new lines, bridges, boxcars and other purposes. This represents 6.4 percent of all lumber consumed in the United States.

Because of their heavy stake in forestry, the country's railroads are employing a constantly increasing number of foresters. They operate as managers of railroad-owned timberlands, in forest products divisions, and advise and encourage sound forestry practices by landowners on or adjacent to railroad rights-of-way.

American railroads have a tremendous stake in forestry. The big engines hauling eighty- and ninety-car trains travel on wood ties and over wood bridges to every section of the nation. And a good part of the costs for the upkeep of these roads is derived from forest products freight. Last year this revenue amounted to $456,325,000, or 6.6 percent of the $6,886,000,000 received for the hauling of all commodities.

Hedgerows

Photos by U. S. Forest Serv

Good When planted in a single row in open country, osage-orange can be fairly easily managed and provides wind protection, wildlife cover and post production. A hedge requires sixteen years to grow a fair-size post. Most durable of midwest woods, a hedge post will last forty years.

Bad This hedgerow was cut for posts in 1946 and subsequent grazing killed it. The owner failed to realize that a single row windbreak on the eastern Great Plains is a valuable asset. As a testimony to the protection given the soil is the ridge of silt that collects at the base of most hedgerows.

These natural buffers of Great Plains gales are being ripped up by bulldozers and replaced by barbed wire fences. What protection three strands of wire will afford their vulnerable land is a question Midwest farmers should ponder before eradicating their hedgerows

By WENDELL H. HARMON

The historical *bois d'arc*, wood of the bow, or osage-orange, commonly called hedge where serving as a field boundary and fence, is rapidly being destroyed. More than 100 miles of hedgerow were pushed out by bulldozers in southeastern Nebraska alone during 1947.

In the early days, the grassy plain of eastern Kansas and southeastern Nebraska, as well as parts of southern Iowa, Missouri and Oklahoma, defied open settlement until a way could be found to fence it. Osage-orange, providing a natural fence, offered the best means and, until the invention and widespread use of barbed wire, thousands of miles of hedge seedlings were planted for this purpose.

There was another reason; on the treeless plains osage-orange hedges served as windbreaks—and it was not unusual to find them around every quarter section of land. Many nurseries for growing the seedlings were established.

As osage-orange prefers deep rich soil for good growth, establishment of hedgerows was not too difficult on the fertile plains. Grass fires formed the greatest hazard, especially when the young trees were just getting started.

Soon after the development of hedgerows, small game became common throughout the area. According to the stories told by old-timers, the number of quail and rabbits was unbelievable. The hedgerows offered cover and, to the rabbits and squirrels, a source of food. Fields lying on the leeward side of the hedgerow were protected from both the winter winds and the scorching blasts of summer. The long rows of trees made the country more livable—gave it a new beauty.

Trimming hedge for fence was a never-ending job for the farm boy. After every rain, it seemed, new sprouts had to be trimmed back. Where a hedge grew to full size, a matter of fifteen or twenty years, the roads were shaded and stayed muddy long after rains. Loaded wagons often had difficulty in passing one another because of overhanging branches. On hot summer days, farmers hauling grain to market with team and wagon avoided the avenues of hedgerows whenever possible. The trees stopped the blowing winds, causing horses to heat.

Osage-orange is a prolific seeder. The seeds are borne in a pulpy green fruit, the size of a large orange. The fruit is eaten by horses and cattle and the seed within the fruit is a source of food for squirrels and other rodents. When seed is scattered throughout an adjacent pasture, a dense growth of new trees will invade the grassland. Many pastures, especially in Kansas, have been invaded by the osage-orange, and the removal of

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U. S. Forest Service Photos

Good "quail country," you say. Yes, but not for long. The bulldozers are coming. Below, a hedgerow planted in settlement days and cut over many times is now ready to yield another crop of posts

HONEY HUNTING

Equipped with a cigar box, a bit of flour, and a drop or two of syrup, all you need do to enjoy this leisurely sport is go out in an open field and watch for a feeding bee

By HARRY BOTSFORD

IF you are allergic to violent exercise, if you seek a quiet, leisurely outdoor rural sport which has the spice of adventure in it, may I suggest that you try honey hunting.

Regardless of where you live, if there are trees in the area, you can almost rest assured that you will find good hunting. You won't have to worry about a lack of honey bees—there are millions of them and each year thousands of domestic swarms escape and take up residence in suitable hollow trees.

Further, your entire hunting equipment will cost only a few cents. No special clothing is required. What is needed is patience, sharp eyes, such minor items as a tablespoon of white flour, a little box you can make yourself, a trifle of sugar syrup and a lot of rural area in which to pursue your sport.

The wooden box should be rectangular, say about five inches long, from two to three inches deep and from three to five inches wide. Let the box have a sliding top, equipped with a small piece of glass as a window. A handy man can make a suitable box in a half hour. If you're not a handy man, cut a hole in the lid of an empty cigar box, then use scotch tape to fasten a piece of window pane over the hole. If you're not handy enough to do this, you'd better forget about honey hunting.

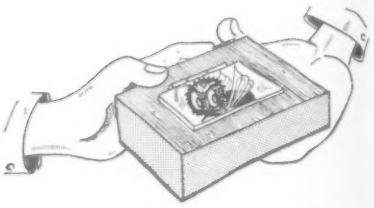
Now for the finishing touch. Take the cap of a bottle and fasten it to the bottom of the box. Into this pour a few drops of syrup. Then put a tablespoon of flour in an empty pepper shaker and slip it in your pocket—and you are ready for adventure!

Any time of the day will do. Any time of the year, when it's warm enough for bees to fly or for flowers to bloom, is suitable for the hunt.

Go out into an open field and watch for a feeding bee. You'll find

one wherever there's clover or flowers. As the honey bee is busily engaged in his work of gathering honey, gently bend the blossom over the open box and snap down the lid. You have captured your first bee, taken the initial step that may lead you to a rich bee tree.

If you watch through the glass window of the box, you will note that the bee is displeased about what happened to him. He will fly around and bat his head against the glass in an effort to escape. But the honey bee's no fool. He will soon calm down and start to examine his prison. He is, by nature, an industrious creature and he doesn't care to waste time. Eventually he discovers the syrup. Cafeteria, *de luxe!* Riches, a table



laden with the prime ingredient for feasting, with enough left over to take home. He forthwith starts to load up. While he is doing this, gently slide back the cover. He won't leave until he carries a pay load. Dust him very lightly with the flour.

When he takes off for home, you'll see one of the reasons for the delicate dusting with flour. He will rise, circle once or twice and then fly directly toward his home hive or tree. It's very necessary that you note the precise direction in which he flies. The touch of white on his body gives him visibility that he normally lacks. If you happen to have a good pair of field glasses, they will help you to "line" the bee.

Leave the cover of the box open and wait patiently. Presently the bee returns for another free helping of your bounty. How do you know it's the same bee? You know because some flour adheres to his body.

While he is loading up for another voyage, close the lid of the box quietly and move 100 yards or so to the right or left angle of the direction of his first flight, which you must always keep clearly in mind.

Open the box. On his second flight he will circle several times to get his bearings. Then, a bee-line homeward. Now is the time for you to do a little job of computing the exact spot where the two lines of flight converge. Once you have established that point, the hunt is getting warm and the excitement mounts.

When your friend returns—and he will—move up to the point of convergence before you release him. You may travel a mile or two miles across

country before you have repeated the performance enough times to enable you to decide that the bee is flying to a determined place. At long last, the slow and leisurely hunt reaches a climax. It may end at the hives on a farm. Which means you will have to start off again. This can and will happen. It's inevitable—but you shouldn't be discouraged.

Eventually, you will be in good luck and there will be a crossing of the "lines" in the woods. Then and there you will know there's a bee tree in your future and it's your job to locate it. It isn't too difficult.

Laws regarding ownership of bee trees are peculiar in some states. You own the honey by right of discovery. The farmer owns the tree. A strict interpretation of the law is that you can't get at your honey without destroying his property. The reverse is also true. To cut down the tree and to salvage the honey requires joint and friendly agreement between the finder and the farmer.

The practical thing to do is to approach the owner of the land and tell him frankly that you have discovered

a bee tree on his premises. Suggest that you jointly and equally share the honey. In almost every instance, you'll find the owner friendly and cooperative. He'll even help you chop down the tree.

Not until cool weather sets in, usually in mid-October, is the time ripe to cut down your tree. By this time the bees have laid in a winter's supply of prime wild honey.

A dark night is ideal. You'll need a cross-cut saw, an ax, flashlights, some wood chisels, long knives and spoons and ladles. You'd better buy a small bee-keeper's "smoker," a little device that generates clouds of sulphur smoke. Don't forget to bring along a wash boiler, dish pans and other containers for the honey.

The tree is felled in a fever of excitement. The snout of the "smoker" is inserted in the entrance used by the bees and pumped vigorously, filling the cavity with smoke, deadening the bees. Now the cross-cut saw is again used, sawing the hollow section of the tree partially in half. Two cuts, if you please, about two feet apart. The ax is used, together with the wood chisels, to split out a vertical section of the tree—and there's your wild honey, a veritable wealth of it, if you're lucky. Also, a lot of bees who will be very resentful if the smoke has not put them to sleep. They can and will sting with vigor. They cannot be blamed for being unhappy about the whole affair. A brimmed-hat, with a veil of mosquito netting provides excellent protection for the face—gloves for the hands, of course. But if you don't watch out, a sluggish, angry bee is likely to crawl up a pant leg. When he reaches unprotected flesh he goes into action. That's one of the hazards you must anticipate.

A large knife and big spoons or ladles are used to cut the honey comb and transfer it to the waiting containers. Wild honey doesn't come in neat little wooden frames as does the domestic honey you buy at the grocers. It is in long, bulky sections, the salvaging of which is a slightly messy job.

How much wild honey can you expect? That's difficult to estimate—it depends on the time of year that your swarm of bees took up residence in the hollow tree, on the size of the swarm, the lushness of the feeding area. It may range from forty to 300 pounds.

Most of the honey will have to be strained. For this, large cheese cloth bags, hung in a warm place, are used.

Wild honey is blessed with a distinctive flavor. It is a mixture of the dark and blond honeys, of buckwheat and clover and other flowers. It's something you can't buy at a grocery store; it would command a premium, if it were available. On hot biscuits or pancakes, wild honey is a sweet that a gourmet will enjoy, it's that good. In cookery, wild honey gives pastry a flavor and a succulence that makes it a prime favorite. Used on a baked ham, it reaches the acme of utility, it seems to me.

Honey hunting is great fun. Admittedly a lazy man's sport, it can help to while away a congenial summer. Once, recovering from a major

operation, and denied the pleasure of fishing and golf, I turned to honey hunting. The gentle exercise was just what I needed. If I tired, I simply sat in the sun and read a book. Two months of being outdoors built me up physically, gave me a robust appetite, made me well again. True, I found only one bee tree, but I had a lot of fun doing it.

Don't go honey hunting in the optimistic expectation of finding a lush bee tree every day. You may not even locate one in a month. But, as you progress and attain skill in "lining" bees, you will find the sport to be absorbing, completely fascinating.

When you find a tree and salvage your honey, share it with your friends. It's a gift that can't be duplicated, and it's one that will be fully appreciated. And don't forget the wax that remains after the honey has been extracted. It has a pretty high market value.

If you approach honey hunting in the right spirit, you'll like it. It's a sport that you can play alone, or with a companion. It's a sport where you make your own rules. The rewards are many—and pleasant.

BILTMORE DAYS

By JOHN B. WOODS

THIRTY-FIVE years after bidding farewell to Biltmore Forest School in North Carolina, its leader, its instructors and the students, that twelve-months' experience remains a rich and warming memory. Since this is more than can be said of college or prep school, there must have been something very special about Carl Alwin Schenck and his method of teaching forestry. Granting that he had the advantage of being equipped with seven-league boots and a wide acquaintanceship with foresters and lumbermen on two continents, one still must admit that he had something unique to offer—himself.

It should be mentioned here that Biltmore was the first school in this country devoted exclusively to the teaching of technical forestry and that Carl Alwin Schenck, young and energetic German forester retained by George W. Vanderbilt to manage Biltmore Forest, scene of one of the first large-scale forestry experiments in this country, was its organizer and leader.

The late Austin Cary, eminent American forester who contributed so much to southern forestry, had words for it. Once, in 1927, when we were together in the field, eating lunch beside a farmer's well in Georgia, and the talk worked around to forest schools, I put in a word about Biltmore and likened Dr. Schenck to the celebrated Mark Hopkins on the other end of a log. But Cary challenged the comparison, declaring that Schenck would never be content to sit still and teach. He would be all around the log, poking at it with his "alpenstock," identifying the genus and species, counting rings to determine its age, calculating its volume, and estimating the quality. If signs of rot were present there would be a lecture on fungi, and eventually the boy on the other end would be called upon to help roll the log over to see what manner of insects, reptiles, or mammals lurked underneath.

Gifted as he was in directing attention to concrete things right at hand, the good Doctor on occasion could and did deal authoritatively with the abstract. Living by certain principles of personal conduct himself, he endeavored to impart them to his students. In my recollection, two are outstanding. One might be summarized by the old aphorism that the civilized man is a gentleman, drunk or sober. The other amounts to a postulation that the educated individual never is overawed by problems that confront him; he reaches into his resources of information, applies his reasoning power, and eventually works out a logical answer. Presumably that approach to the solution of everyday problems explains why the textbooks written by C. A. Schenck for his Biltmore students contained myriad unadorned facts, nearly as many excellent illustrations, and practically nothing else.

From the professional point of view, two of Schenck's famous dictums have come down through fifty years and stand as monuments to his good sense. His declaration, "That forestry is best which pays best," can be interpreted to mean almost anything. Actually what was meant was that successful forestry must be flexible and realistic as of any moment during the necessarily long cycle of tree growth; that forestry needs income so that it can be more intensive, particularly when and where it is new and struggling for a foothold. His contention that "Between the primeval forest and the cultured forest there always is devastation" shocked many a rabid conservationist who wanted him to damn the lumbermen unqualifiedly—but it was demonstrated long ago in all European countries where forestry came to be.

Dr. Schenck—"His dictums stand as monuments to his good sense"

From his earliest days in America he tried to make use of tested German ideas and techniques, though he soon saw that much of the best of European forestry must wait here for suitable economic conditions. Out of keen observation he drew possibly the most realistic conclusion evolved by any of the early workers in the American forestry field. It was that while intensive forest management here must await such scarcities as would bring prices high enough to "pay the bill," foresters could and should work constantly wherever conditions could be developed favorably, to make beginnings. And, above all, foresters should learn to log and manufacture, in order to cope with realities.

So much for the man Schenck. He was a splendid teacher, a charming and vivid personality. The school he founded possibly made its greatest contribution to American forestry between 1909 and 1913, after it severed relations with the Biltmore Estate and took to the road. This is not to say that earlier students did not learn as much forestry in the years of riding over the mountains; probably they learned more of what should be done in the Appalachian region. But during the travel years the group was larger, averaging forty to fifty students perhaps, and they happily called attention to themselves wherever they went. Learning about forestry and lumbering, they also aroused interest in this new science among the timber

owners who needed most to be shown the possibilities of applying forestry to their business.

The Biltmore course was one full year of twelve months. A student could join at any time; he simply stayed on until his time was up. I joined on April 1, 1912, at Tupper Lake, New York, and quit at Kurhaus Sand, in the Black Forest of Germany, late in March, 1913. In between were some 20,000 miles of travel, 300 days of hard work and unforgettable experiences and friendships.

Tupper Lake and all the other lumber and pulp towns and logging camps of the Adirondacks were deep carpeted with snow that April thirty-six years ago. Yet every afternoon of the fortnight spent there the whole student body took to the outdoors, visiting mills, camps and forest preserves of one kind and another. Each forenoon there were lectures in the parlor of the town's principal hotel. By reference to my dog-eared diary—diary keeping was a *must*, and they were graded at the end of each month—I learn that Dr. Homer D. House lectured on forest geography, while Dr. Schenck discussed fish and game management and forest policy.

After a fortnight in the Adirondacks the school moved on to Washington for a brief visit with forestry officialdom. Thirty-five members of the U. S. Forest Service talked to us about many phases of public forestry. All but one now are retired or deceased; happily more of the former than the latter. There is a faint recollection of our being shown a card with an adult beetle (*dendroctonus frontalis*) stuck to it, and several lines of more or less rhymed report written thereunder.

"This is the beetle dendroctonus
He lives in the bark of the pine."

After declaring with feeling that this beetle eats pitch, the writer concluded with the somewhat far-fetched assertion that it is harder to kill than a lion. This was supposed to have been the first report made by a Forest Service field man on an early insect infestation somewhere out West. But it may be wholly apochryphal; I seem to recall the incident, but my diary is primly silent about the whole thing.

One experience during that week in 1912 is worth recording for its sentimental value — an evening of good talk topped off with brown bread and baked apples at Gifford Pinchot's house. And speaking of an evening at G. P.'s reminds me of the *saengerfest* also held that week (because they were so different).

On the road Biltmore students happily called attention to themselves wherever they went—which aroused interest in the new science of forestry

The Biltmore *saengerfest* was an institution deserving mention. It was a cross between a German *bier abend* and an American college fraternity initiation, yet invested with a slight tinge of professional seriousness by the simple expedient of having a guest speaker or two. The monthly *saengerfest* might be held in a hall, or it might be out-of-doors beside a roaring campfire. Its *sine qua non* was a ten-gallon keg of nectar from the nearest brewery. Usually there were a few new students to be doused with beer and paddled mercilessly. And always there was good fellowship and the singing of school songs.

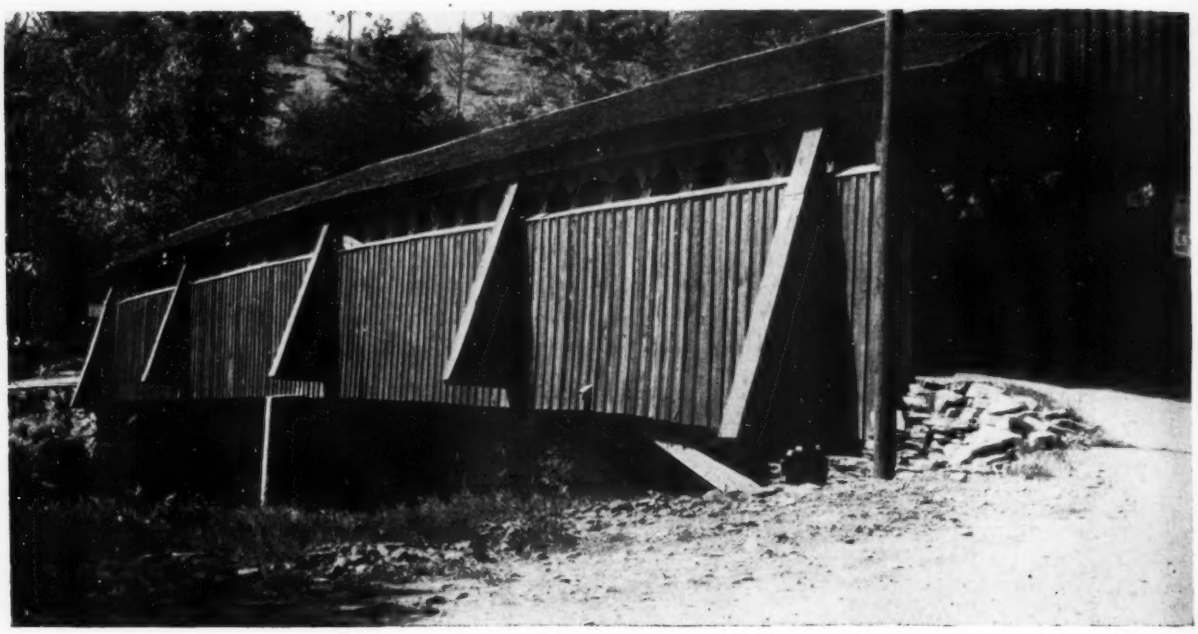
Following Washington we moved on to a row of tents beside a logging railroad at Camp Perry in the North Carolina coastal area near New Bern. For a week we listened to lectures forenoons and in the afternoons cruised timber, studied the opening foliage of a rich southern flora and watched logging of longleaf pine by highly skilled Negroes using both mule power and machinery. Here, also, a few of the newer members came in contact with another Biltmore ceremony, the christening. It seems that everyone was required to assume a nickname, so periodically the whole school assembled beside a body of salt or fresh water, and one by one the unnamed students were awarded monickers and thrown into the drink.

Then the school went across North Carolina to its spiritual home in the mountains near Asheville. Actually we settled down in the tiny logging hamlet of Sunburst, on the upper Pigeon River. Morning lectures were held in the local school house, and the regular diet provided by Drs. Schenck (logging and lumbering) and House (plant physiology) was varied and enriched by courses of special lectures on zoolgy, economics, forest law, and entomology by five recognized authorities who possessed the ability to summarize briefly the more practical aspects of these really vast subjects.

Field trips now became really rugged, sometimes extending to fifteen miles or more in an afternoon. Yet their impact was softened by "mountain dew," obtained easily by placing a jug over a silver dollar on a stump at the edge of camp. There were visits to the Biltmore plantations and to the highup logging locations. The utter incompatability of steam skidders and silviculture became apparent to forestry neophytes upon these Appalachian slopes. Additions were made to herbariums against a future dendrology test. And there were visits to sawmills and pulping and other wood conversion plants. This carried on until mid-June, then the school moved north, with stops at Cincinnati, Fort Wayne and Grand Rapids to see paper mills, catalpa plantations and furniture manufacture.

(*Turn to page* 469)

What it was like to be one of "Schneckses Foresteers" when Biltmore Forest School was the seat of forestry learning



COVERED BRIDGES ON THE DELAWARE

By JAMES R. SIMMONS

IN 1910 my brother and I, and a bank clerk with a week's vacation on his hands, made a trip down the west branch of the Delaware River in a homemade rowboat which we called the Mud Turtle.

Our chief purpose was fishing and camping but since all three of us were born on the headwaters of the Delaware and our fathers had gone to school with John Burroughs and Jay Gould, we cherished an ambition to set down in our diary a few "observations" which we hoped had escaped those earlier and more renowned explorers of the Delaware country.

I find the diary today a commonplace document except that it arouses an appetite for brook trout and hot coffee and creates a longing to view once more the rugged scenery of mountain and stream caught by our old box camera so many years ago.

One redeeming feature of the record is an entry made on June 21, 1910: "Rain drove us to shelter and we cooked our evening meal under the old wooden bridge at Hamden." As my eye fell upon that entry twenty-five years later, I resolved to go back to the Delaware and photograph every

The sign on Fitch's bridge states a fine will be imposed for "driving faster than a walk"

covered bridge along its course from Delhi, New York, to the Delaware Water Gap.

Although covered bridges on the Delaware are vanishing landmarks, nothing much has been done for them in literature, and the day will soon arrive when the best specimens may no longer be photographed. Soon enough some of them will have broken under the strain of modern traffic. A large lake in the upper Delaware valley to augment the water supply of New York City will eventually wipe out several more. A few in which there is a live public interest may survive the present century. Possibly five or six wooden bridges spanning the Delaware or its tributaries will remain at points where a super highway will never be needed.

In this category is Fitch's bridge between Bloomville and Delhi, about fifteen miles from the source of the Delaware (West Branch). Eighty-five feet long, it has two single and two double flying buttresses. There is a ten-foot clearance and the end buttresses rest on dry masonry piers that have withstood the pressure of frost and flood for 100 years. A sign at the entrance warns that five tons is a safe load and that a fine of $5 will be imposed "for driving faster than a walk on this bridge."

No more wooden bridges are found between this point and Delancy where, near the old Hymers farm, stands a covered bridge typical of those built in 1859 at a cost of $1,000 each.

The Delancy bridge has very low buttresses, both at the ends and in the middle. For some reason the end buttresses are attached to the second beam or girder instead of the outside girder and extend only halfway from the floor to the top of the bridge. The overall length of this bridge is about 110 feet. During the decade from 1925 to 1935 the Delancy bridge was severely strained by passage of heavy trucks seeking a short route to the valley of the East Branch of the Delaware. New routes through the mountains have relieved this pressure.

Below Walton, in the town of Colchester, is a bridge of similar construction. Its setting on the level farm land of the valley with mountains in the background is captivating.

Between Colchester and Hancock are found remnants of two bridges that served the farming people during most of the nineteenth century. Only the stone piers of the old Cannonsville bridge remain. At Barbersville, on a small tributary of the Delaware, is an unused bridge with timbers fully exposed to the elements. This structure furnished an excellent opportunity to study the basic construction of these old landmarks, as all but one section of side boards have fallen off and washed away.

There's a thread of sadness in this saga of wooden bridges — many of them vanishing landmarks pushed aside in an age of speed

The Beaverkill is one of the best trout streams in eastern United States. Rising on the slopes of Double Top Mountain, it enters the East Branch of the Delaware at the town of East Branch. On this stream are three covered bridges—at Turnwood, Beaverkill Camp Site and Cook's Falls.

Turnwood bridge is scheduled for removal and replacement. A new concrete pier on the north side looks modern and efficient and will no doubt support one end of a substantial and handsome iron bridge spanning the famous waters at this point. But many a fisherman and many an admirer of Beaverkill Valley will lament the passing of the old wooden bridge.

The bridge at Beaverkill Camp Site may remain for an indefinite number of years. It marks the site of a famous recreational center and does not impede modern traffic. During the summer months fishermen may be seen casting for trout beneath this bridge or standing hip-deep in the rocky pools upstream. The bridge is about ninety feet long, with a clearance of nine feet, and will carry a load of four tons. It is practically unused today.

The Cook's Falls bridge presents an impression of disintegration and decay, yet a modern concrete ramp has been constructed on the north side and pleasure automobiles and trucks shoot through the structure with all the confidence and abandon known to an age of mechanical gadgets and speed. The roof and floor appear to be in excellent condition but the side timbers have rotted away. This is a fairly long span and one wonders how many times the old landmark can vibrate, bend and recoil before plunging to the riverbed. Flood waters have many times crept around the north pier but as yet not a stone has shifted its hold.

The best point from which to start a tour of covered bridges on the East Branch itself is Arkville. There the main highway from Kingston through the Catskill Mountains begins to turn north in the direction of Roxbury, the home of John Burroughs, the naturalist. It was near Arkville on Dry Brook, a tributary of the East Branch, that Mr. Burroughs put his boat into the water when he explored the Pepacton River. Burroughs called the East Branch by its original Indian name. He remarked that it seemed a little incongruous that he should launch his boat into Dry

Lattice work on Barbersville bridge is held by wooden pins

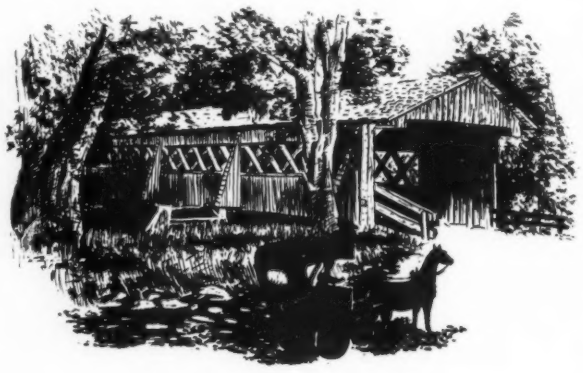
Middle pier of Hall's bridge is for breaking up river ice

Closeup of interior arch construction of Colchester bridge

Brook, yet the stream, he said, was here a fine trout stream and he soon found its waters wet enough for all practical purposes.

The first covered bridge as you proceed downstream is Dunraven, just outside the town of Margaretville. This bridge has several features uncommon to Delaware bridges. A narrow pointed pier was constructed in midstream for the purpose of breaking river ice and the bridge is protected against stresses and strains by an inside arch. The heavy timbers of the arch extend into the piers at either end and are joined at the apex. The bridge has five flying buttresses and is 100 feet long with a clearance of nine feet.

About a mile west of Dunraven in the town of Arena is Hall's bridge. This serves as a link between the main highway and mountain farms lying south. It is 105 feet long, supported in midstream by an ice breaker and its abutments are protected by large sections of sandstone rock standing on end. Against these stones steel rails have been placed for additional service against river ice. The appearance of the stream at Arena gives evidence of flood danger and one gets the impression that nature has even enlisted the services of trees along the shore in the cause of protection for an old bridge that struggles to survive.



At Shavertown it is worthwhile to turn from the beaten path and drive along a little stream called the Tremperskill. Here is a small covered bridge only fifty-five feet long. The best view is from the north side. Gently sloping mountains form a captivating background and nature has landscaped the bridge with maple trees on either side.

On the south side of Shavertown a small but often turbulent tributary stream enters the East Branch of the Delaware somewhat as the Tremperskill enters from the opposite direction. On this stream stands the smallest covered bridge in the entire collection. It is reached by way of the Lew Beach-Shavertown road. This bridge is only forty-four feet long with a clearance for traffic of ten feet. The distance from the floor of the bridge to the stream bed is only seven feet, and for many years flood waters have lashed at this stubborn little structure, found it impregnable and therefore passed around it to reach the main stream a mile farther on.

At Pepacton undoubtedly is the "long covered wooden bridge" referred to by Mr. Burroughs in his writings. I found no cliff swallows nesting under the timbers but other discoveries rewarded a search for the features mentioned by the beloved naturalist of the Catskills. The amateur photographer will enthuse over the wooden arch, visible only from the inside, for its artistic lines and suggestion of strength and permanence. To the architect and builder this arch will have a special appeal because of its similarity to the modern bow-string truss. The river at this point is broad and fairly deep and requires a span of 135 feet. Pepacton bridge has five flying buttresses, all of the same size and construction.

At Downsville is a bridge 140 feet long with a clearance of eleven feet. The roof is of metal and comparatively new. The timbers are massive and their arrangement is in striking contrast to the diamond pattern common in most lattice bridges.

After Downsville there remained but one bridge to photograph and study, which in a way was fortunate, for my quest along the Delaware ended abruptly with the approach of World War II. On my way to a wartime assignment in Maryland, I crossed the lower Delaware by way of the long covered bridge at Columbia, New Jersey, opposite Portland, Pennsylvania, a few miles below the Delaware Water Gap. This is a magnificent bridge, the longest on the river and one of the oldest in the East. It contains several wooden arches.

To the glory of town fathers, county commissioners and American citizens at large, it can be said that no unsightly advertising disfigures these covered bridges. What little advertising does exist is in the nature of jack-knife carvings of persons whom nature endowed with no resistance in the matter of registration in the wrong places.

But on the inside of most bridges, and sufficiently high to discourage removal by officers of the law, will be found small advertising posters naming some of the older commodities, chiefly patent medicines, livestock feeds and grocery store articles familiar to the preceding century. These create no offense in our day and generation and, in some cases, inspire a smile. Examples of such old-century advertisements are: Brown's Troches — Yeast (try it) Foam — Lydia E. Pinkham's Vegetable Compound — Mrs. Winslow's Soothing Syrup — C. A. Axle Grease — Kendall's Spavin Cure — and Professor Flint's Powders For Cattle.

The bridges were roofed and side-covered for protection of their tie beams and struts, and particularly their joints and pins, against weather. For when decay sets in at the joints of wood trusses, the entire structure is in danger of falling apart. The bridges were originally built for horse-drawn loads and the old-time carpenters knew what vibration would do to long-spanned, heavy wooden structures.

Some writers on covered bridges have pointed out that side boards not only served as protection against storms, but had a quieting influence on spirited or unruly animals and, therefore, prevented accidents. Also without such protection the roof would be vulnerable to wind force and the lattice work and struts would be exposed to beating rains and an accumulation of snow. So it would appear as if both roof and siding were essential to the life of these bridges.

Most of the covered bridges on the Delaware are of the "lattice truss" type, believed to have been introduced around 1820. No other form of construction has met with more general favor among engineers and builders. Its simplicity, the ease with which it can be framed and economy have secured its use for viaducts of almost every class. For long spans and heavy loads arches or arch braces are required. As transportation problems during the years have increased, many old covered bridges have from necessity been strengthened with props from below and by arches and braces above.

The lattice truss in its simplest form consists of two sets of chords connected by diagonal ties. The chords are formed of three-inch by twelve-inch plank (white pine being commonly used as the original bridge timber of the Northeast) and lapped so as to break joints both above and below. The braces and ties are also of three-inch plank placed between the chords and pinned with wooden pins at all the intersections.

(*Turn to page* 469)

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LEVI WILCOXON FOREST

A pioneer Crossett woods boss receives the perfect reward—his company gives his name to the pine forest he cherished

By JAMES D. CALLAHAN

ONE summer in the waning years of the nineteenth century, a slender high school boy made application for and received the job of carrying water for the log crews just starting to operate in the vicinity of what is now Crossett, Arkansas. He returned to school in the fall, but each successive summer until his graduation found him back at the job he loved, working in the woods.

In 1902, at the age of seventeen, Levi Wilcoxon started to work full time for the Crossett Lumber Company. From then until his retirement a few years ago he maintained a keen interest in everything that pertained to his beloved pine forests.

When Levi was in his late twenties he was made superintendent of the Crossett woods camps. He took in his stride the arduous duties of a job that would have taxed the energy of older, more experienced woodsmen. These logging camps tended to be fairly rugged places. Despite the fact that workers were encouraged to bring their families and excellent facilities were provided, there was not much to do, and leisure time weighed heavily on the hands of the active loggers.

Sensing this, the new woods boss did everything in his power to provide healthy, wholesome recreational outlets. Under his benevolent influence the camps became pleasant places to live. In cooperation with the Y.M.C.A. Wilcoxon was instrumental in providing varied entertainment for the young and old who made the camps their homes.

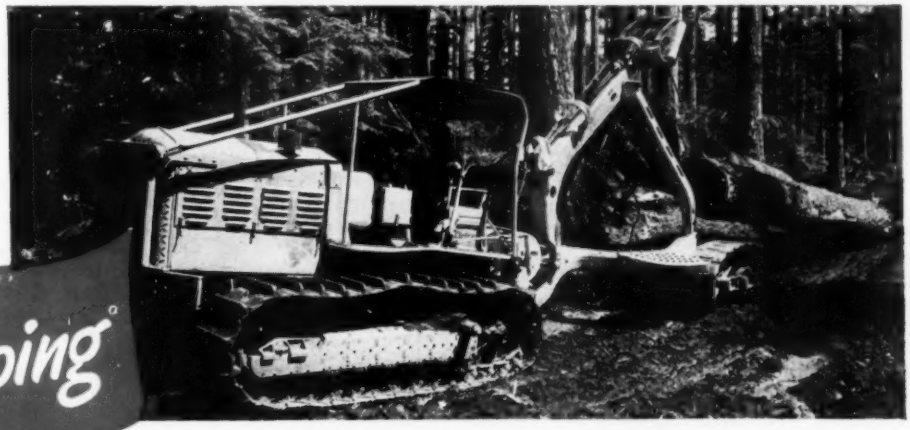
Many of the men and women who now hold responsible positions with the Crossett companies recall that Levi Wilcoxon, the woods superintendent, was never so busy that he couldn't field a few balls for the boys, or stop and admire the newest doll of a little girl.

All of these people and hundreds of others turned out this spring to dedicate the Levi Wilcoxon Forest. a

(*Turn to page* 468)

Levi Wilcoxon (left) little dreamed that the pine forest he set aside for the enjoyment of the public in 1939 would one day be named in his honor. Below, part of the crowd that attended the forest's dedication

Rhodes Studio, Crossett, Arkansas



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NEWS IN REVIEW

More than $2,200,000—the largest payment of its kind ever made—will be distributed to eighteen western Oregon counties as their share of proceeds from the sale of timber on two and a half million acres of federal revested Oregon and California railroad grant land during the 1948 fiscal year.

The O and C lands are portions of the public domain in western Oregon which were granted for the construction of a railroad between Oregon and California in 1866, but subsequently reverted to federal ownership because of violations of the provisions of the grant. The organic law for administration of these areas by the Secretary of the Interior called for the money payment to the counties as well as the installation of a sustained-yield program of timber management under which a safe economic balance between the volume of tree-growth and tree-cutting would be maintained.

• • •

Albert C. Cline, formerly director of the Harvard University Forest at Petersham, Massachusetts, the oldest intensively managed forest in the United States, has been placed in charge of U. S. Forest Service studies and investigations of the world's forest resources and industries. A native of Dutchess County, New York, Mr. Cline succeeds William Norwood Sparhawk, who retired last month after thirty-eight years with the service. Mr. Cline entered the Forest Service in 1946 to head the Industry-Resource Analysis Section of the Division of Forest Economics. He came to Washington early in World War II to work with the lumber branch of OPA. He transferred to the lumber and lumber products division of the War Production Board in 1943, and later became chief of its program branch and vice-chairman of the requirements committee which allocated lumber to both foreign and domestic consumers.

• • •

The Secretary of the Interior has announced that $10,780,620 will be available to the forty-eight states during fiscal year 1949 for the restoration and development of their wildlife resources. This is an increase of $2,516,848 over 1948.

The money is apportioned to the states under the terms of the Pittman-Robertson Act, the funds coming from the eleven percent excise tax paid by the manufacturers of sporting arms and ammunition.

In order to obtain the federal grants, the states must contribute twenty-five percent of the cost of the projects. On this basis the total amount which will be available for federal-aid wildlife work during fiscal year 1949 will be $14,374,160.

• • •

About two and a quarter million pine seedlings were planted in North and South Carolina by the West Virginia Pulp and Paper Company during the 1947-48 planting season, company officials report. Carried out between November and March, the plantings covered ten counties of the two states. Most of the work was done by hand, although planting machines were used to good advantage when conditions permitted. Loblolly, slash, longleaf and spruce pine were planted in a variety of sites, including cutover woods, farm land, wet boggy areas, dry ridge tops, coastal plain swamps, Piedmont hills, scrub oak ridges, heavy clay soils and deepest sands.

• • •

Two major developments in western forestry, one good and the other potentially serious, were reported to the Western Pine Association's forest conservation committee in August. The group heard Ernest L. Kolbe, association chief forester, report that timber of all species throughout the West is growing at a rate unprecedented in forestry history. The statement helped counterbalance a report the day before by N. S. Rogers, Oregon state forester, that the dread spruce budworm, which already has hit an estimated million acres of timberland in eastern Oregon, has spread for the first time west of the Cascades. The lat-

Wide World Photos, Inc.

This forest fire near Santa Cruz, California, on September 2 ravaged 5,000 acres of timber, burned a number of buildings and threatened nearby towns before it was brought under control

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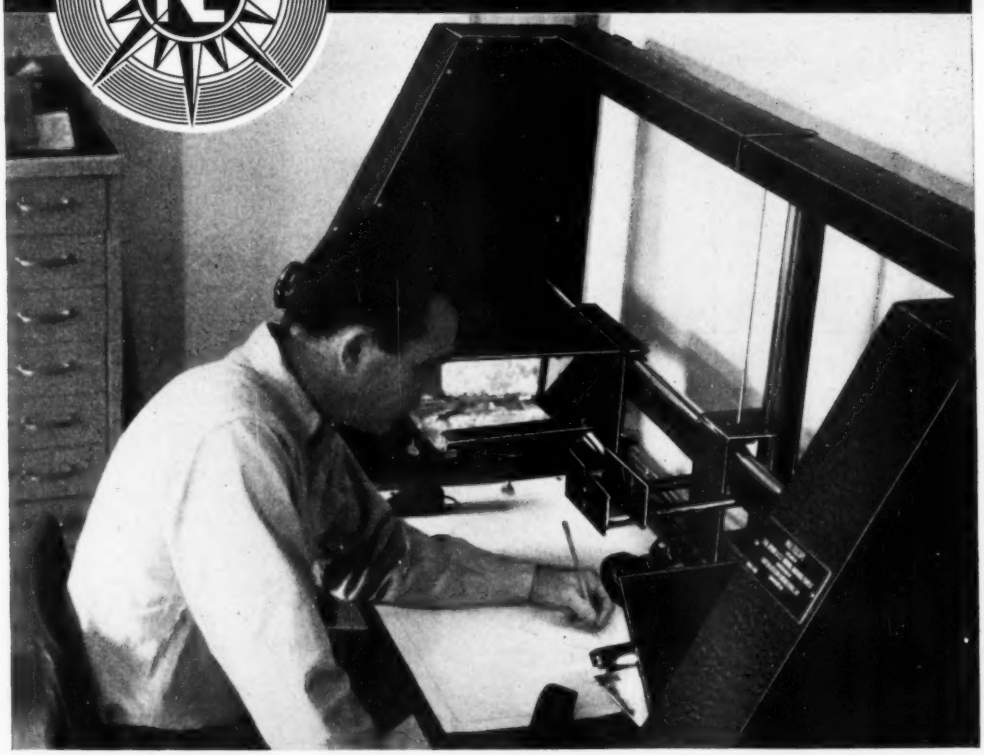

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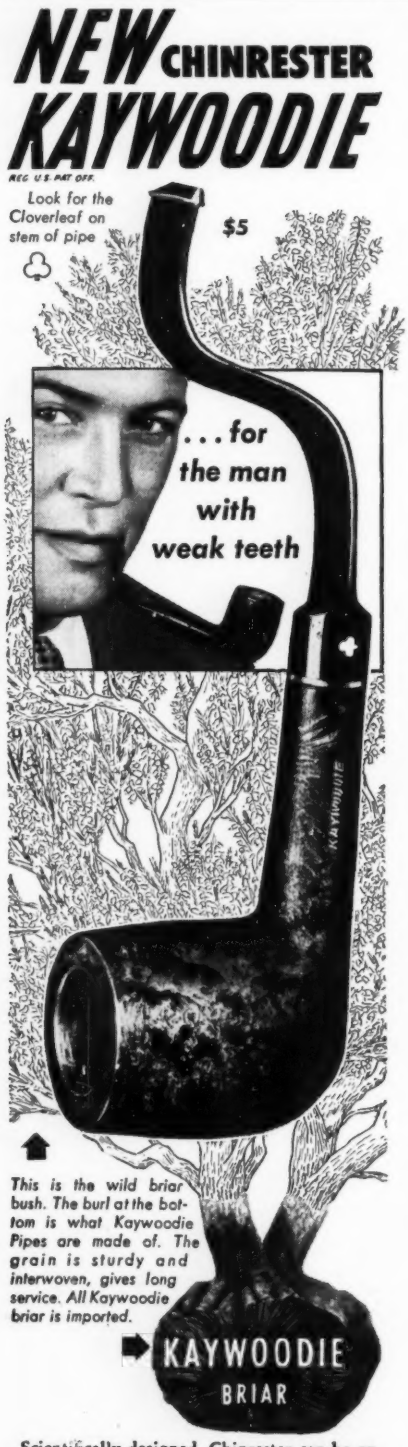
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est outbreak occurred in about 400 acres of timber north of Springfield in the Willamette Valley, 100 miles south of Portland. A huge aerial spraying program may be necessary to curb the infestation, it was stated.

• • •

Seth Gordon, nationally known executive director of the Pennsylvania Game Commission, retired from state service at his own request on September 1 to devote full time to national conservation problems. He will be succeeded by Thomas D. Frye of Westmoreland County, Pennsylvania who has had more than thirty years' state service.

• • •

Dr. Gustav A. Swanson, youthful and energetic chief of the U. S. Fish and Wildlife Service's Division of Wildlife Research since 1946, and one of the nation's leading wildlife scientists, has resigned to accept a position as head of the Department of Conservation at Cornell University.

Educated at the University of Minnesota, Dr. Swanson engaged in teaching and research there from 1937 to 1944, when he was placed in charge of the national Cooperative Wildlife Research Unit program.

• • •

A new method of prefabricated house construction using an inexpensive but durable combination of wood veneer and kraft paper, is described in a report now on sale by the Office of Technical Services, U. S. Department of Commerce.

Known as "K-Veneer," the new material is made of a single three-sixteenths of an inch wood veneer, slit by a unique process, and bonded to .016 to .030 inch kraft paper. Species and grades of wood formerly impractical for such purposes can be utilized, including hemlock and white fir.

K-Veneer, according to the report, proved to be stiffer, stronger and more puncture-resistant than insulation or gypsum-board, and stiffer and stronger than quarter-inch plywood as normally applied.

Research on K-Veneer was sponsored by the Office of Technical Services with a $37,000 grant as part of a $1,500,000 program to stimulate industrial development. The Elmendorf Corporation of Chicago signed an "actual cost" contract for the work.

K-Veneer can be manufactured in a continuous machine that slits the veneer, bonds the paper and adds a mineral-surfaced felt for external panels. The process is therefore simpler than the manufacture of plywood, according to the report.

• • •

The revenues of the National Park System and other areas administered by the National Park Service reached a new record high during the 1948 fiscal year, with a total of $3,303,327, Director Newton B. Drury has announced. This is an increase of $379,741 over 1947 receipts.

• • •

Citizens of Illinois have been invited to participate in the Illinois Forestry Congress, Urbana, on October 28 and 29, under the sponsorship of the Illinois Technical Forestry Association in cooperation with the University of Illinois. Primary purpose of the Congress will be to enlist public support for the adoption of an action program to secure full development of the state's forest resources.

Key representatives of industry, labor, agriculture, education and other fields have been invited to participate.

Speakers will include W. L. Burlison, head, agronomy department, University of Illinois; H. P. Rusk, dean, College of Agriculture; S. L. Frost, executive director, The American Forestry Association; Chester Davis, Federal Land Bank; Kenneth Reid, Izaak Walton League; Lyle Watts, chief, U. S. Forest Service; Charles Shuman, president of the Illinois Agricultural Association, and others.

• • •

Meetings You Should Attend

October 6 and 7—Southern Forest Festival, Valdosta, Georgia.

October 8 to 11—Annual Meeting, The American Forestry Association, Hotel Patten, Chattanooga, Tennessee.

October 21 and 22—Forest Products Research Society, Northeast Section, Hotel Pennsylvania, New York City.

October 28 and 29—Illinois Forestry Congress, University of Illinois, Urbana, Illinois.

November 12 — Holly Society of America, New York Botanical Garden, New York City.

December 9 to 11—39th Annual Conference, Western Forestry and Conservation, Victoria, British Columbia.

December 16 to 18—Annual Meeting, Society of American Foresters, Hotel Statler, Boston, Massachusetts.

March 7 to 9—14th North American Wildlife Conference, Statler Hotel, Washington, D. C.

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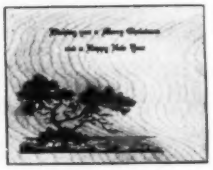

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TRAIL RIDERS OF 1948

(*From page* 436)

old D. Johanson, Chicago, Illinois; Miss Donna Klewer, Chicago, Illinois; Miss Marguerite F. Little, State College, Pennsylvania; Mr. and Mrs. Arnold Malkan, New York City; Dr. Mary E. Mercer, New York City; Miss Catharine W. Pierce, Cambridge, Massachusetts; David Y. Pittman, Orlando, Florida; Miss Sara E. Rode, Washington, D. C.; Miss Florence Sander, Des Moines, Iowa; Miss Doris Schmidt, Chicago, Illinois; Mrs. Ethel W. Self, Manhattan, Kansas; Philip W. Smith, New Hope, Pennsylvania; Jacob R. Stear, Lancaster, Ohio; Miss Ruth H. Steidle, New York City; Worth A. Summers, San Leandro, California; Miss Muriel Swayze, Denver, Colorado; Arthur Turnbull, Far Hills, New Jersey; Miss Arla E. Weinert, Detroit, Michigan; and Miss Helen Wentzel, Estes Park, Colorado.

Expedition No. 7:—Sawtooth Wilderness, Sawtooth and Boise National Forests, Idaho: Dr. Mabel Adams, Phoenix, Arizona; Miss Barbara Bolton, Detroit, Michigan; Charles L. Borklund, Foley, Florida; Miss Eleanor Daniels, New York City; Bright M. Dornblaser, Milwaukee, Wisconsin; Dr. H. N. Elfenbaum, Chicago, Illinois; Mrs. Mildred King Finley, Coeur d'Alene, Idaho; Dr. A. Robert Fuchs, Long Beach, California; Mr. and Mrs. Edgar Gadoury, Dudley, Massachusetts; Miss Madeline Goddard, New York City; Lacey Laughlin, Detroit, Michigan; Herbert Ohlson, Rockford, Illinois; Miss Dorothy Purcell, Streator, Illinois; Herman Schaefer, Jr., Chicago, Illinois; Mrs. G. B. Shepard, Missoula, Montana; Dr. Seward C. Staley, Urbana, Illinois; Mrs. Laura B. Stephens, Los Angeles, California; and Miss Josephine Strachan, Cleveland, Ohio.

Expedition No. 8—Cascade Crest Wilderness, Snoqualmie and Columbia National Forests and Goat Rocks Primitive Area, Washington: Kingsley Brown, Willimantic, Connecticut; Miss Elizabeth Buell, Santa Barbara, California; Miss Alice L. Burnett, Brooklyn, New York; Tom G. Clark, Arkadelphia, Arkansas; Miss Elaine Cohen, St. Louis, Missouri; Miss Elinor Davis, New York City; Herbert M. Dutcher, Arlington, Massachusetts; John Ferguson, Baltimore, Maryland; Miss Margaret Gausewitz, Kansas City, Missouri; Mr. and Mrs. William H. Kain, York, Pennsylvania; Miss Helen K. Ketterer, Pittsburgh, Pennsylvania; Miss M. Louisa Long, Zamora, California; Mrs. Carolyn Manz, Chicago, Illinois; Dr. and Mrs. Miles R. Markley, Denver, Colorado; Dr. Katherine M. Meyer, Chicago, Illinois; Miss Ella May Ottery, Santa Barbara, California; Miss Ellen Virginia Seaman, Perth Amboy, New Jersey; Miss Millicent Stebbins, Chicago, Illinois; Miss Maude Louise Strayer, Dobbs Ferry, New York; Gerald E. Welsh, Denver, Colorado; H. Justice Williams, Philadelphia, Pennsylvania; and Miss Josephine J. Williams, Chicago, Illinois.

Expedition No. 9—Inyo-Kings Canyon Wilderness, Kings Canyon and Sequoia National Parks, Inyo National Forest, California: Mrs. Isa Lloyd Brandon, New York City; Robert Campbell, Fairmont, Minnesota; Chester Carre, Washington, D. C.; Miss Lilian Egleston, Fresno, California; Dr. H. N. Elfenbaum, Chicago, Illinois; Miss Caroline Flaccus, Washington, D. C.; Miss Anna Giebultowicz, Washington, D. C.; Miss Lois R. Hartung, Chicago, Illinois; Mrs. Naida Hayes, Berkeley, California; Miss Vicky Krider, Middlebury, Indiana; Jack Lewis, New York City; Robert Lewis, N. Hollywood, California; Miss Marie H. Lynch, Chicago, Illinois; Miss Frances Joyce McArdle, Chicago, Illinois; G. Curtis Miller, Oakland, California; Walter Grant Powell, Downey, California; Henry Schnitzler, Los Angeles, California; Anthony Wayne Smith, Washington, D. C.; Miss Leona W. Smith, Van Nuys, California; Dr. J. Howard Snively, Seattle, Washington; Robert B. Snively, Seattle, Washington; Charles W. Stendig, Bronx, New York; Miss Aleksandra Walewska, Washington, D. C.; and Albert S. Walker, Yorba Linda, California.

Superior National Forest Canoe Expedition: Harry L. Aleson, Richfield, Utah; Armand T. Beauregard, St. Louis, Missouri; Mrs. Charles L. Fetzner, Pasadena, California; Miss Isabelle Galo, Milwaukee, Wisconsin; Mr. and Mrs. Frederic S. Glover, Jr., Grosse Ile, Michigan; Frederic Glover, Grosse Ile, Michigan; Albert B. Lowrie, Grosse Ile, Michigan; Edmund G. Lowrie, Grosse Ile, Michigan; Edmund G. Lowrie, Jr., Grosse Ile, Michigan; Harry B. Lyford, Elgin, Illinois; Mrs. Dorothea Sheats, Washington, D. C.; Miss Beth Stuart, Seattle, Washington; Mrs. Laura F. Warfield, Washington, D. C.; Robert Warfield, Washington, D. C.; and Edmond G. Levy, Milwaukee, Wisconsin.

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It's **not** CUTTING TO A SPECIFIED DIAMETER. Because this method permits cutting certain fast growing trees and prevents cutting certain slow growing, defective trees.

It **is** CUTTING AFTER MARKING. Marking each tree to be cut assures removal of all slow growing, defective, or crowded trees and the leaving of healthy, fast growing trees properly spaced for maximum growth.

Timber Marked For Pulpwood Thinning

Same Stand After Thinning

Harvest your pulpwood by thinning out marked trees only. Either ask your state forestry representative about getting your timber marked or **write** us. Our expert timber markers are available at no cost to you, in areas of Louisiana and Mississippi tributary to our mill.

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FIRE, by George R. Stewart. Published by Random House, New York. 336 pages. Price $3.

Conservation subjects can be dramatized, as George R. Stewart has so vigorously proven in his new book. The hero of *Fire* is "Spitcat," a tiny spark that grows into a violent monster, against which man pits his cunning, strength and strategy.

The author's thrilling drama of the smouldering growth of "Spitcat" and of man's frailties, heartbreaking failure and successes, in battling the flaming holocaust makes intensely interesting reading.

Here is a novel by the author of a previous successful book, *Storm*, which pays great tribute to the nation's forest fire fighting forces. It should accomplish much good in forest fire prevention.

THE GREAT FOREST, by Richard G. Lillard. Published by Alfred A. Knopf, Inc., New York 22, New York. 399 pages, illus. Price $5.

This is one of the most readable histories of American forests that has been published in a long time. It is the story of what happened to the forests, how they were used and abused and finally all but destroyed in some instances in the swift conquest of the land.

Mr. Lillard whets the interest of the reader in the close relationship of Americans and wood early in his book by providing minute descriptions of early colonial life. These descriptions are loaded with detail but never are dull.

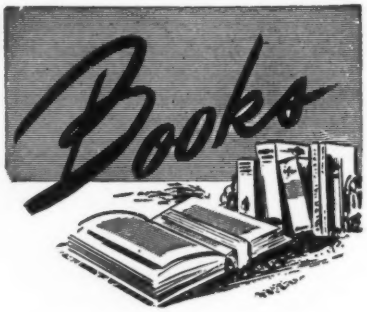
The Great Forest opens with backwoods days and proceeds from there with woods warfare in Revolutionary times, the conflict with Britain over ship supplies and timber and how King George set aside great tracts of American timber for ships' masts for the Royal Navy.

The stories of the great woods operations, the industrial baronies of the Middle and Far West and the financial and political chicanery of the latter part of the nineteenth century are vividly described along with the beginnings of the conservation movement—with its key figures and organizations.

The book provides 24 pages of half-tone cuts, line cuts and three maps.

OUTDOORS UNLIMITED, edited by J. Hammond Brown. Published by A. S. Barnes and Company, Incorporated, New York City. 343 pages, illus. Price $3.50.

This is a collection of forty-four



stories published in various outdoor magazines by writing members of the Outdoor Writers Association of America. The collection abounds with fly rods, hunting dogs, game birds, animals and campfires. The pieces are illustrated by leading outdoor artists who have a feeling for the birds, animals and fish they depict. Primarily, this is a book to be read for enjoyment and relaxation by sportsmen and, taken in easy doses by a winter fireside, it will undoubtedly rekindle their desire to get out there once again with fishing rod or shotgun. As Editor Brown comments in his preface, the names of the writers of this volume comprise a "Who's Who" of modern outdoor literature — in the recreation field.

TREES AND TOADSTOOLS, by Dr. M. C. Rayner. Published by Faber and Faber, Ltd., London, W.C. 1, England. 71 pages, illus. Price, 6s net.

In non-technical language, the author explains the association between trees and soil fungi. He discusses certain toadstools as indicators of soil conditions, as converters of soil nutrients and emphasizes the beneficial effects as well as harmful ones of numerous fungi and soil organisms.

PAUL BUNYAN'S BEARS, by James Stevens. Published by Frank McCaffrey, care of Acme Press, Seattle, Washington. 129 pages, illus. Price $2.75.

Most of these stories have been adapted from yarns originally published in various magazines but have been drastically revised by the author, an expert on Paul Bunyan. The stories are tailored to order for children who will exalt in such delightful affairs as "When Bears Had Tails," "The Tree That Never Grew Up" and "When Elephants Flew in Swarms"—the latter of which might have been a forerunner to Walt Disney's motion picture "Dumbo." But, as the author points out, his story was drafted first.

The publications listed below must be ordered direct from the addresses as given and not through the Association.

Our Public Lands, Their Administration and Use. Printed and distributed by Izaak Walton League of America, Inc., 31 North State Street, Chicago, Illinois. Price 25 cents.

Modern Building with Wood. Timber Engineering Company, 1319 18th Street, N. W., Washington 6, D. C.

Timber Marketing in eastern Ohio, by H. R. Moore and O. D. Diller. Ohio Agric. Exp. Station, Wooster, Ohio.

Wood Distillation. Bulletin 15, Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn. Price $1.

Federal-State Cooperative Snow Surveys and Irrigation Water Forecasts for Columbia Basin, May 1, 1947, by Div. of Irrigation, Soil Cons. Service, U. S. D. A. Box 835, Boise, Idaho.

Handbook of Information on Entering Positions in Forestry (revised edition), by Shirley W. Allen, Professor of Forestry, School of Forestry and Conservation, Univ. of Michigan. Published by Society of American Foresters, 825 Mills Bldg., Wash., D. C. Price 25 cents.

Farm Fishponds for Food and Good Land Use, by Verne E. Davison. Senior Biologist, Biology Division, Soil Conservation Service. Farmers' Bull. 1983, U. S. Dept. of Agric. U. S. Gov. Printing Office, Washington, D. C.

The Pocket Gophers (Genus Thomomys) of Arizona, North American Fauna 59, by Edward A. Goldman, U. S. Dept. of the Interior, Fish and Wildlife Service. U. S. Gov. Printing Office. Price 15 cents.

Studies of the Protozoan Parasites of Fresh-Water Fishes, Fishery Bull. 41, by H. S. Davis, Ph.D., U. S. Dept. of the Interior, Fish and Wildlife Service. U. S. Gov. Printing Office. Price 30 cents.

California Forest Insect Conditions, 1946. A report prepared in cooperation with the Forest Insect Laboratory. California State Board of Forestry, Sacramento, Cal.

Special Treatments of Wood, Bull. 18, Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn. Price $2.

Harvard Forest, Bulletin No. 23, Results of the First Thirty Years of Experimentation in Silviculture in the Harvard Forest, 1908-1938, by R. J. Lutz and A. C. Cline, Petersham, Massachusetts.

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★ Powered with heavy-duty auxiliary industrial engine . . . equipped with rehaul line . . . gathers logs from a radius of 1200 feet.

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Forest "Co-ops" Seen Aid to Free Enterprise

Cooperatives handling forest products for farmers and other small woodland owners by helping their members become more independent and self-supporting "serve to strengthen our rural economy and to sustain the best qualities of the American tradition of free enterprise," according to a U. S. Department of Agriculture report, "Forest Cooperatives in the United States." The report is the sixth of the series being issued by the Forest Service on its 1945-46 reappraisal of the forest situation.

Though comparatively few forest cooperatives have been organized so far in the United States, the survey says that these associations have had enough success in obtaining better markets and in bringing about better woodland management to warrant their inclusion in a comprehensive program for the best and most productive use of the forest resource.

The report points out that in many parts of the country farmers are now paying high prices for timber shipped from other regions and often have difficulty getting building material they need. This is viewed as particularly ironical in woodland regions. Forest cooperatives can aid farmers and small owners not only as producers of forest products but as consumers. Operated on a good forestry basis, they can contribute much to the welfare of woodland communities as well.

Particularly concerned with associations which are committed to good forest practices as a means of keeping woodlands productive, the report is based upon the experiences of 57 "co-ops" of different types in various sections of the country.

Railroads Have a Stake in Forestry

(*From page* 447)

of railroad foresters is constantly increasing. Some serve as managers of railroad-owned timberlands, some work in wood preservation and utilization, others with the purchasing departments in wood procurement. Last but certainly not least, some serve as forestry development agents whose job it is to advise, educate and encourage sound forestry practices by landowners on or adjacent to the right of way of his railroad. Regardless of their duties, the aims and purposes of railroad foresters are the same—protecting the railroads' stake in America's forests.

The first recorded meeting of a group of railroad foresters was in October 1946, in Washington, D. C., during the American Forest Congress, called by The American Forestry Association. This little band of seven, now grown to twenty-two, agreed that in order to help promote better forestry practice in the United States they would: first, identify the railroads as one of the industries actively engaged in the perpetuation of our forests; second, encourage reforestation on forest lands now nonproductive; third, encourage forest fire prevention; fourth, actively aid all forestry agencies in forest conservation.

Because of the present and future demands for forest products, the maintenance of forest production is a national "must," calling for unity of action on the part of owners, producers and users alike.

The railroads' stake in America's forests can be summarized in three parts: adequate timber supply for self-use, protection to their rights-of-way by better control of excessive runoff or surface waters, and future traffic of forest products. Obviously, the railroads generally recognize the need and endorse a conservation program that will enlist the rank and file of our people in a nationwide crusade for America's forests.

Wilcoxon Forest

(*From page* 458)

tract of virgin pine named in his honor. Back in 1939, when Levi was manager of the forestry division and a director in the company, he supervised logging operations in the vicinity of the forest site. He thought it would be an excellent idea if a portion of this virgin pine forest could be set aside for future generations. Accordingly, he made arrangements for the preservation of a 500-foot strip on each side of the highway between Hamburg and Crossett.

Most of the trees in this virgin

stand are 100 years old—some 150 years. It includes the 250-year-old Matoon pine, the largest loblolly pine on record in Arkansas. It is fifty-three inches in diameter and 127 feet tall.

The official naming of the forest came as a complete surprise to Wilcoxon. His friends and acquaintances from all over Ashley County, as well as from other parts of the state, assembled, on May 27, in the new roadside park that surrounds the dedication marker.

P. F. Watzek, general manager of the Crossett Lumber Company, in officially naming the forest, paid this tribute to Levi Wilcoxon: "Having conceived the idea of a virgin pine stand for posterity it is fitting that this area bear his name. And unlike so many ceremonies of this nature, the Crossett Lumber Company wanted the ceremonies and the reservation to be made with Mr. Wilcoxon in attendance, so that he might know that his idea is a reality and that his splendid record of achievement is being acknowledged."

Covered Bridges

(*From page* 456)

Covered bridges as we know them are an American product, developed by our local carpenters, craftsmen who for the most part never heard of a structural engineer. These men met the needs of their time with energy and great skill, using the materials they found at hand. And we who now seek to preserve their works as historic monuments may reflect with pride that theirs was a contribution of singular merit as compared with that of any group of builders in any land or during any period, since the time in 650 B.C. when the oldest wooden bridge on record was thrown across the Tiber at Rome—the bridge that Horatius defended.

Biltmore Days

(*From page* 453)

The next stop was at a new and so far unoccupied logging camp beside a tiny glacial pot-hole called Lake Deyhuff, north of Cadillac, Michigan. This was a homecoming to the northern youths; to a New Englander the sugar maples, beech, birch and basswood were warmly familiar, albeit a great deal larger and taller than anything left to posterity by the Pilgrim fathers. It was a splendid introduction to the logging and manufacture of hardwood timber, by virtue of daily field trips. Also it was pleasant

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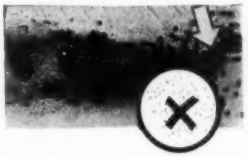
It might be a tough shot or a chance at a big mallard that almost knocks your hat off. A squirrel high in the timber . . . a pheasant out over the tall corn. No matter what the shot, you'll get power, speed and knockout punch—when you shoot Remington Express shot shells.

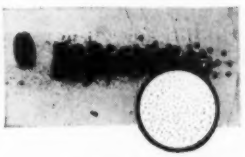
In addition, Remington shells have the New Remington Flat-Top Crimp, improved "Wet-Proof" construction, corrugated bodies for easier handling, progressive burning powder, lubricated wadding, perfect shot pellets and "Kleanbore" priming. Remington Arms Company, Inc., Bridgeport 2, Connecticut.

PATTERN

Spark photo shows how shot charge of old-style shell is obstructed (arrow). Result, a "blown" pattern (circle). Note holes and thin spots in pattern.



Spark photo shows unobstructed flight of shot charge produced by the New Remington Flat-Top Crimp. The result . . . a perfect pattern (circle).



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Here's the smashing power of a Remington Express shell. Enough, and more, to knock down a set of bowling pins at duck-shooting range. Not one pin was left standing.

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Like hair on a dog's back young trees are growing all over the Pacific Northwest in the Douglas fir region.

On 8,144,700 acres of forestland, once logged, new crops are growing. These junior forests, backlog of our future forest supply, range in age from 10 years to 90 years. They will be the forest giants of 1980, 1990 and all the years in the future.

Forest management has come to the Douglas fir forests, under private impetus, at just the right time to insure perpetual crops of trees. Therein lies the guarantee of perpetual crops of forest products from out here.

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to sit through the cool Michigan forenoons listening to the regulars, Schenck and House, expound whatever they were teaching at the time, and to be enlivened by four newcomers who lectured on geology, animal husbandry, timber treating and forest statistics.

Michigan also gave us introduction to certain fundamental problems of timber ownership and forestry, chief among them the threat and the reality of fire in the woods. Here, too, we saw for the first time examples of high-pressure land selling followed by slow starvation of the vendee; a heritage from the period when all cutover lands were needed for agriculture, because almost all were actually farmable soils, while some of these Michigan soils were not. And the problem of what to do with waste wood, including inferior species was much in evidence. One answer, the chemical plant, already was established at Cadillac.

After the usual sojourn in town for visits to sawmills and many other wood conversion and related plants, the Biltmore entourage took over a train composed of two tourist cars, a baggage coach and a diner, and crossing the "Soo" was snaked wildly westward a matter of three days and nights and deposited finally upon a dock at Harrison, Idaho. Then ensued a steamer trip over Coeur d'Alene Lake and through the river to Saint Maries, and a stop of two or three days at the Kootenai Inn, while lectures languished and field trips took us over much of northern Idaho. Skidder logging, transportation of logs by flume, Forest Service timber sale administration, and fire protection all claimed our time. Finally, we went on down to the Pacific Coast.

A trip to the logging operations on the slopes of Mount Ranier, or as my diary maintains, "Mount Tacoma," was a high point for many eastern boys. And it furnished as well a first meal of West Coast log-camp cooking, which somehow has persisted in memory through the years. Oyster soup, followed by roast turkey and beef for those who preferred it, several vegetables and delicacies, both tea and coffee, three or four kinds of pie, stewed fruit and ice cream composed the meal, which the local foreman claimed was only ordinary chow. Several of the boys decided then and there to practice forestry on the Pacific Coast.

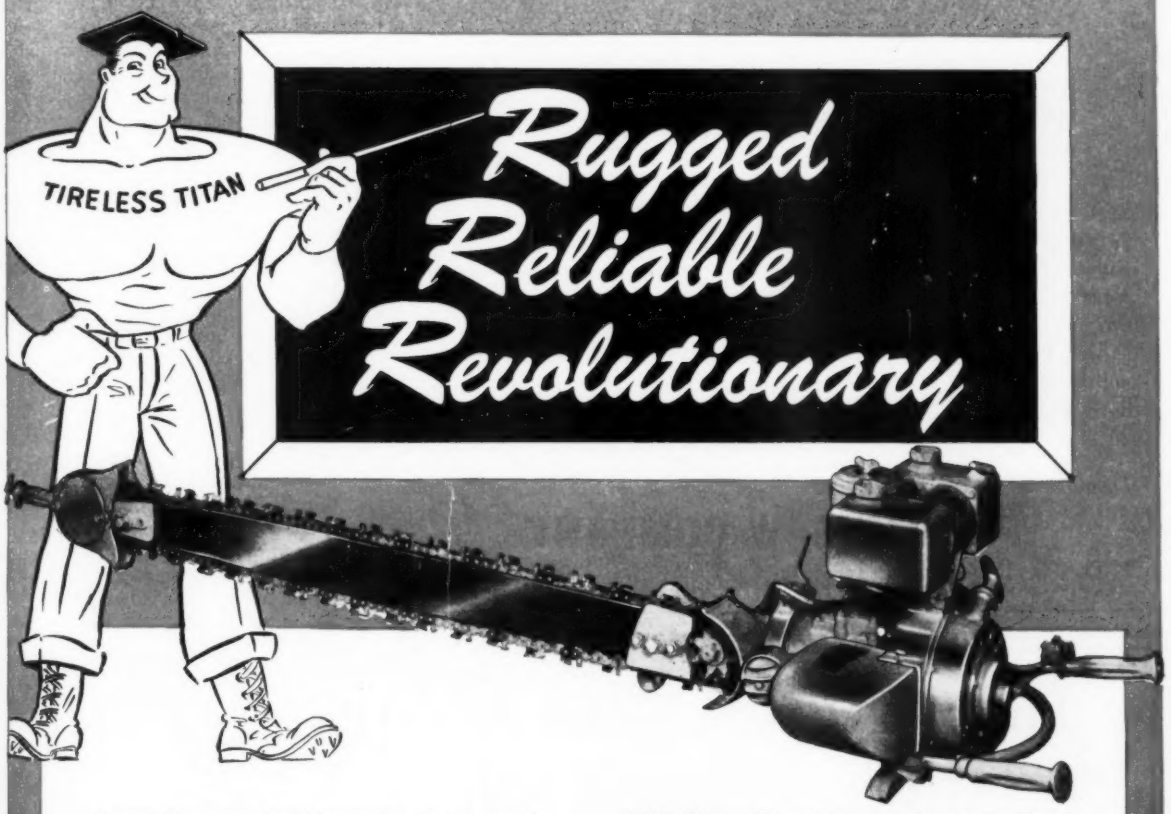
A visit to log scaling and grading operations in Puget Sound occupied a day and the following night was given over to a train ride down to Portland, Oregon, where the school went aboard the old steamer *Breakwater*, fondly known as the *Ocean Corkscrew*, for a voyage to Coos Bay. But, of course, there was first a marvelous trip down the broad Columbia River and out across the bar.

Coos Bay, in 1912, was an important lumber producing point, but quite off the beaten path. A narrow road zig-zagged over the mountains from the Willamette Valley, and twice each week a motor stage made the attempt to carry in people and their luggage, and to take them out. Freight went in by boat from coastal points, as did many passengers. From mid-August to the end of September we lived in Marshfield; listened to lectures forenoons in the village school house and roamed the waterways in a leased "gas-boat" the balance of each day. Coming in tired and hungry from visits to steam donkey settings high upon some mountainside, one could dine with a Japanese restauranteur or go down to the wharf where a lady Viking fried salmon steaks as thick as her plump hand and served them, followed by unlimited cocoanut cream pie, for twenty-five cents. Yet even then, in that sector, wages were fifty cents an hour for most occupations and higher for some.

There were several foresters at work near Marshfield, most of them from earlier Biltmore classes. They were engaged in mapping and planning railroads to get logs, setting up forest protection schemes, and even thinking about regeneration of these seemingly limitless timber stands. It is worth noting that at least one of these fledgling foresters of 1912 still lives beside Coos Bay, a leading citizen of the community. The size of the trees and the machinery with which they were brought to mill were overpowering—there was too much for us to learn in a short time. So it is doubtful that the Biltmore Class of 1912 contributed much to the saga of Oregon logging. Yet we did accomplish one worthwhile enterprise, a mill study of the out-turn from "conky logs." And we helped plant a few hundred Douglasfirs and white or Port Orford cedars on a recently logged tract.

The *Breakwater* took us north again, and the school headed eastward, with a stop at Salt Lake City to visit Forest Service activities in the Wasatch Range. On October 1 there was a general assembly on the Holland-American Line pier in Hoboken, to take ship for Holland and Germany. But that, as Mr. Kipling used to remark, is another story.

TITAN..



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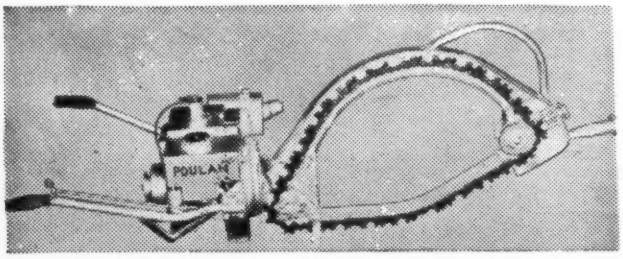

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Walcheren

(*From page* 443)

the dune. On the lower slopes they will be farther apart. We know it is the twigs that break the force of the wind. You in America plan your shelterbelts so as to have twigs and branches close to the ground. After the pines have started, we shall plant more grass and then ground-juniper. Such forests do not make us any lumber, but much as we need wood, we need our land more."

"But how about the dunes?" I asked. "You have cut back shrubs and trees, taken out branchwood, raked up litter, pulled up grass, built roads—aren't all these things bad for the forest? Will not the sand start blowing?"

The old man laughed. "You should have seen how we helped the Germans. They know nothing about sand." Then he told me more of the story.

When the Germans fortified the island, they built radio towers, gun emplacements, and a lot of other things, including tunnels and underground chambers, in the dunes. They had to build roads to get the materials up on top, so they cut out a lot of trees. Then when the vehicles got stuck in the sand they raked in the pine needles, lopped branches off the trees, cut the heather and juniper, and did a lot of other things that exposed the soil and allowed the wind to get in.

"Of course," the old man said, "we helped. We cut and slashed and tore out much more than was needed. The sand began to move before the equipment was in place. Under the steady winds and especially in some of the storms, the roads were choked, entrances to tunnels were sanded over in a few hours despite frantic shoveling, the radio towers and other equipment were buried as they lay, gun emplacements were covered before the guns were available. Even the encampment was in trouble."

All during the occupation of the island, the Germans had trouble with the dunes. The old man laughed as he described how fires would break out, how the farmers gathered pine straw for their fields, how they cut firewood. He roared as he told how the Dutch farmers insisted their cattle had to graze in the dunes. "Why there wasn't anything in the sand the cows would eat, and no Dutchman had ever though of pasturing a cow in that stuff. But the Germans didn't know any better, so they let the cows stir up the sand. Everything we did

only increased the troubles of the Germans with the sand. The legs of a tower were blown out in one night and the tower had to be rebuilt. Some of the heavy guns were so placed that a gang of soldiers was always shoveling sand. And those roads—they were impassable most of the time.

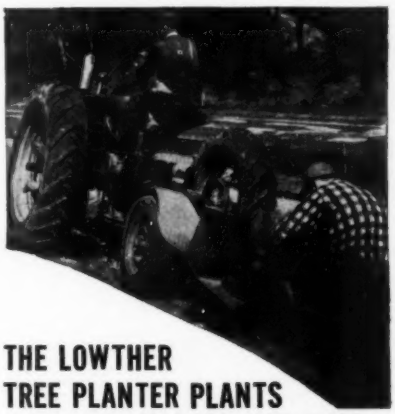
"Now look at our forest," he said. "It's ruined."

The Germans—with the help of the islanders, of course—had ruined the forest. Now a whole new program of dune reclamation was necessary. This would require a lot of work wherever the sands had been exposed and would take several years, but the first part of the job had already been completed. Low fences (about two and a half feet high) had been built, grass had been started, and trees planted. However, there was a shortage of pine seed and the supply of young plants was exhausted. Most of the trees already planted were growing, and it would be only a year or two more before they would be big enough to anchor the sand.

Even before the breaks in the dikes had been closed, power lines had been strung into the island and electric pumps installed. These highly efficient pumps were not as picturesque as the old-time mills, but they were certainly removing the water rapidly. A few ditches had been started and the ground water was gradually being lowered. But in a country where machinery is lacking, the ditching was proceeding, oh, so slowly.

Some of the higher land that had been free of water in the spring was being farmed. Even I could see how poor were the crops of turnips, potatoes and rye. I took a hoe from one farmer and tried it myself. It was different from ours, heavier and at first awkward to use, but I soon got the hang of it. The ground was hard, exceedingly hard and lumpy. I asked if it were always this way. So the old Dutchman explained.

Salt, a mixture of sodium and chlorine, affects soil texture. When sea water comes in contact with the land, the sodium replaces the lime in the soil. This is not too bad so long as the chlorine is present as the soil then retains its granular or crumb structure. But chlorine is unstable and is readily lost. So when the chlorine is removed, the soil is a sticky goo when wet and as hard as the proverbial brick when dry. In re-



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claiming the land the lime must be put back.

The first step in reclaiming the land, of course, is to remove the salt water. Then fresh rain water is allowed to accumulate and stand on the soil. This absorbs the chlorine in a matter of weeks and then it, too, is pumped out. This flushing is repeated a time or two. As this water is removed, the soil rapidly loses its texture and becomes a gooey mess. Then the sodium must be replaced by calcium. In the old days sea shells were collected, burned, and the lime spread on the land. This process, though effective, was exceedingly slow and a lifetime of effort was required to sweeten the soil. Today, using gypsum, the process requires only a few years.

Gypsum is applied to the soil, the rains accumulate, and then the water is pumped out. By repeating this process a number of times, the salt is removed, the soil gradually regains its structure, and the land becomes ready for use. It was expected that after five years or so of such work, the soil would be so restored that good crops could again be raised. But the people of Walcheren ran into hard luck. For two centuries Holland had not had such a dry year. With so little rain, the soil was not leached. Thus it may be five years more before Walcheren is really on its feet again. Even then, perhaps a fourth of the island has been so injured by erosion and deposition that centuries will be needed to bring it back to a high state of productivity. Some of the inland may never be worth farming again.

The Dutch government encourages the use of alfalfa as the first crop. Its deep roots improve the soil, and it keeps the light sands from blowing. It also makes a fair pasture in the first year or two. But how can there be cows when even the water in the wells is too salty to drink? All the fresh water must be hauled in from the mainland until the ground water becomes sweet again. As farmers can't eat alfalfa, they must raise potatoes and turnips. Neither of these yield much in this alkali soil and they certainly don't improve it. But they are edible. Grains don't do so well either, and it will be several years before a decent crop of rye can be grown.

I talked to some of the farmers. Their government is giving them aid by furnishing them livestock, by helping in the drainage, reclamation, land leveling, plowing and seeding. It also rebuilt their houses. Although German prisoners had removed many of the mines from the fields, some of the deeper and non-metallic ones could not be found. These will create hazards which may be felt for many years, but to such minor matters the farmers are shutting their eyes. They want to be independent. They want homes, hedges and trees. But it will be ten or more years before the soil is sweet enough to permit trees to live. This and the destruction of the soil, the farmers feel, is their real loss. It has set them back a century or more.

Yes, the war records show that Operation Walcheren was a success. But at what a cost!

I said good-bye to the old-timer and wished him and his neighbors luck in their undertaking, realizing to the full how dependent the Dutch are on their pine forest. One could be amused at the scrubby woods but could not belittle their value in holding the sand. It was clear the Dutch had two jobs, one of holding dikes, the other of stabilizing dunes. It is no wonder that the legend of the little Dutch boy at the dike has lived down through all these years. The philosophy of the story is ingrained in the make-up of a people who understand that a little water can ruin a dike, and that wind can be stopped by a forest.

Peshtigo

(*From page* 445)

It is easy today to bracket the major activities of the county agent and his committee in terms of policy and action over the years, recording some pitfalls they missed and some they didn't; but viewing it from their uncharted location the demands made then on their imagination and foresight began to be appreciated. In the end they developed four major land use policies—each important to the completeness of the whole.

They supported and brought about a system of county forests, supplemented with state financial aid, which was enlarged through the systematic taking of tax deeds by the county as disinterested owners failed to pay assessments. In short, they gave a destiny to the land. They endorsed, and got, a county rural zoning ordinance, which prohibited future settlement on useless or marginal land, and provided forestry and rec-

reation as the principal alternate uses for land so zoned. Sometimes by trade, but more often by purchase, they acquired the scattered lands of small owners in the county forests and the dwellings of isolated settlers, who, through the enactment of the zoning ordinance, were denied the coming of neighbors. Here, economy in local government, as well as improvement in social conditions, was effected. Finally, they developed a pattern of land sales for non-forest land and timber sales on public forest lands.

But before this pattern could be fairly visualized, much less put into being, there was study and analysis. The report took the form of a College of Agriculture bulletin entitled, "Making the Most of Marinette County Land," the first in a sequence of land-use studies published for a number of northern Wisconsin counties. Its purpose and its proposals deserve a few words.

The measure of the business-like approach of Marinette County officials in 1928 to their forestry and land-use problems is found in their directive to the committee of county officials which included county agricultural agent Drewry: "Tabulate by townships the trend of agricultural development, local tax expenditures, assessed valuations, and road and school facilities; and submit maps showing soil classifications, location of active and abandoned farms, crop acreages, forest areas and idle lands."

Here was the very reverse of the land promoter's approach to bringing in new settlers. Only a few of the answers could be found in county records. The vital answers were to be had only through first-hand knowledge of the land, the people still on it, and the industries which supported urban populations. The greater part of a year was required to make the maps and assemble the statistical tables. Then the committee chose to go further than merely record conditions. It proposed action. It recommended the creation of a system of county forests with the lands obtained through tax delinquency; a county unit school system, to adjust school enrollment and equalize costs, supplemented by consolidation of school districts; and the exchange of arable lands held by the county in farming districts for the poorer holdings of scattered settlers. The county board approved the recommendations, and to implement the first and last of them, there was created the committee on county land and forestry.

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College of Agriculture the committee's findings became common knowledge to most of the citizens of Marinette County, while the bewildered officials of other counties with similar problems found the clue to reorganizing resources and services.

The map of county land ownership suggested the location of the desirable county forest units. Draw boundaries around them in colored crayon, give each a name—and there you have the county forests, on paper, It wasn't that simple. To be of any financial help to the county the land needed to be entered under the newly enacted forest crop law under which the state would pay local governments ten cents an acre a year as a form of advance on the taxes. Drewry, with Goodman's support, held that the law was not exclusively for the benefit of private timber owners, and that the county lands were proper areas for forest crop classification. The attorney general ruled in favor of the county. The way was opened for not only Marinette but for all other counties to make use of the law.

But there was another detail in the law that could not be solved by mere attorney general opinion. The legislature had required clear evidence of a forest crop growing on the land within five years of its approval for forest crop classification; otherwise, the land was to be rejected. There was plenty of desired land being entered under the law as forest crop which had no crop on it, and the county was financially unable to put one there. The solution to this situation was a new law, and a wholly new venture in Wisconsin or any other state, in cooperative forestry relations between the state and the counties. The state offered, in effect, a partnership. It pledged itself to finance the reforestation of county forest crop land through a grant of ten cents an acre a year paid to the county, thereby making it possible for the county to show good faith in carrying on the practice of forestry. In turn the state would take, in the form of a cutting tax, fifty percent of the appraised standing value of any county timber cut.

At this significant period in the development of the Marinette County forests, Charles Drewry, in addition to his duties as county agricultural agent, was named county forest administrator.

By 1932, when this forest aid law became effective, there were 75,000 acres of county forest land in Marinette County. Today it exceeds 220,000 acres. A forest improvement budget of ten cents an acre annually appears to be precious little, but not all the county forest land needed replanting, and fortunately the several federal work programs of the period made outstanding contributions to progress. Forest improvement took the varied forms of tree plantings, thinnings, release cuttings, construction of roads, trails, fire lanes and telephone lines, detailed type mapping, and re-running of old land survey lines, with the setting of more permanent corner posts. Between 1932 and 1947 a total of 13,363,000 trees were planted. In 1940, the planting schedule exceeded 3,000,000 trees; by far the largest number of trees planted in any county forest of the state that year — or any other.

The steady increase in the total county forest area resulted partly from a consistent policy on the part of county officials to execute tax deeds promptly on all lands in county forests which became tax delinquent, and partly through a policy of purchase and exchange of scattered private holdings. The first was largely routine, because it was policy, and by direction of the county board. The second approach represented aggressive planning and consistent alertness. Drewry let no opportunity escape to consolidate the public forest areas, and to increase their net worth.

The urge to speculate in undeveloped lands died slowly. So long as there were owners of tracts of cutover land, wholly unfit for agriculture, who would nonetheless hasten to close a deal with an unsuspecting seeker of land, there could be no assurance that land clearing and its attendant fire dangers could be kept out of the county forests, to say nothing of later demands for public services, such as roads and schools for a scattered few. Wisconsin's rural zoning law gave counties the power to

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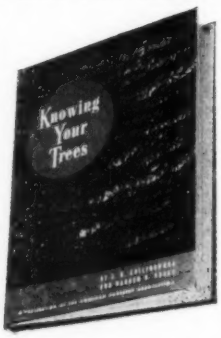

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zone land for agriculture, forestry and recreation. Here was authority to prevent future trouble in land settlement. But because it was an application of police powers to restrain certain uses of private land, its successful application would depend upon public support and understanding. This meant carrying on first an educational project, in the form of public discussion meetings in the rural town halls of every town likely to have some of its lands included in a restricted use district of the proposed zoning ordinance. County Agent Drewry arranged for all of the meetings, and with the help of W. A. Rowlands, his supervisor from the College of Agriculture, explained the function and purpose of rural zoning. The Marinette County rural zoning ordinance was enacted in 1934, with the concurrence of the town boards of all towns affected. Over 300 thousand acres, part of it privately owned, were thereby declared out of bounds to future settlement. Subsequent amendments have enlarged the restricted area. The Marinette County rural zoning ordinance is still very much in effect. What has it saved the county? As well ask how much destruction of property and life is saved by having modern fire departments. Zoning functions by preventing, not overcoming, abuses in land use.

But at the same time, the county officials were keenly aware of the need for plugging some public financial losses caused by scattered settlement for which zoning came too late. From the humanitarian viewpoint, too, they knew there were unfortunate settlers who needed help in starting anew under more hopeful surroundings. In short, a settler relocation program was in order.

The first sixteen isolated settlers whose holdings were bought out were financed entirely at the expense of Marinette County, or more specifically, out of the county forest aid fund. The lands involved were entered promptly under the forest crop law since they were within the boundaries of the several county forest units. Today, forest plantations blanket fields where fruitless toil brought only sorrow and despair.

By 1944 the county forestry committee found under its administration over 1,100 acres of former farmsteads, at an average cost of a little more than $11 an acre. Yet county resources were unequal to completing the job. In 1939, at the urgent request of the College of Agriculture, the resettlement and land purchase program under the administration of the U. S. Department of Agriculture was modified to apply to settlers in Wisconsin counties, who, under the zoning ordinance of twenty-five counties, were classed as established, non-conforming users, provided the purchase of individuals or groups of settlers could be shown to be essential in the saving of public expense, or were in the interest of public health.

Marinette County readily qualified for this project, and an additional twenty-one settlers sold their holdings of more than 2,200 acres. The Williamson settlement south of Dunbar and the Phillipsburg settlement northwest of Athelstane were completely removed in this land purchase program. Their closing produced substantial public savings. Shortly thereafter all of the lands involved were leased to the Wisconsin Conservation Department. They have now been offered for outright sale to Marinette County for forestry purposes and shortly will be incorporated within the county forests. The pledged word of Marinette County, plus its zoning ordinance, is assurance the lands never again will be offered for settlement.

For ten years following the establishment of county forests in Marinette those timber sales made were limited strictly to the removal of dead or damaged timber, or to products cut in timber stand improvements under public work projects. The conviction was widely held by elected county officials that the county had suffered too heavily from over-cutting

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and fires to permit timber sales on county lands. Drewry, familiar with the little-traveled by-roads of the county, and ever mindful of the capacity of trees to grow in volume like any other crop of the soil, didn't share this ultra-conservative viewpoint.

Wartime demands for timber gave him his opportunity. He recommended, and got, approval of a policy for offering marketable timber, principally aspen, for sale by competitive bidding, but only after he had taken his committee to some timber sales on national and state forest lands, and to several other counties that had been selling old defective timber which suddenly was found to be useful. Stumpage sales which yielded a gross income of $2,640 in 1942, after the deduction of the state severance tax of fifty percent, had grown ten-fold in amount by 1947.

As the interested partner in the county forest enterprise, the state, through the Conservation Department, had its district forester mark the timber for cutting, or otherwise supervise the logging operations in the interest of good forestry. Nearly 250 public timber sales have been made involving the cutting of the equivalent of 37,000 cords of wood. More detailed work plans, type maps, and the revealing eye of the aerial camera, recently used to photograph all of the county forests, point to an ever-increasing acreage of timber growth approaching the day of initial harvests.

Some will say that a man with an eye to showmanship directed the dedication of income from county forests to a single public purpose. If so, it is the kind of showmanship foresters have needed. Unlike the proceeds of timber sales from other county forests, which are paid into the county general fund, the Marinette sales are paid into the county hospital bond liquidation fund. Since 1944 the timber sales fund has provided the county treasurer with $35,674 for the credit of the hospital bond fund. This was over $8,000 in excess of the amount needed to meet annual maturities of the bonds. It appears that the county hospital is going to be paid for far ahead of schedule. And after the hospital—what?

Two hundred and twenty thousand acres dedicated to timber production are a mighty source of potential revenue to the county. The worried lines on the faces of county officials concerned with making ends meet financially in the county are fairly well erased. There are those who know that better days are ahead.

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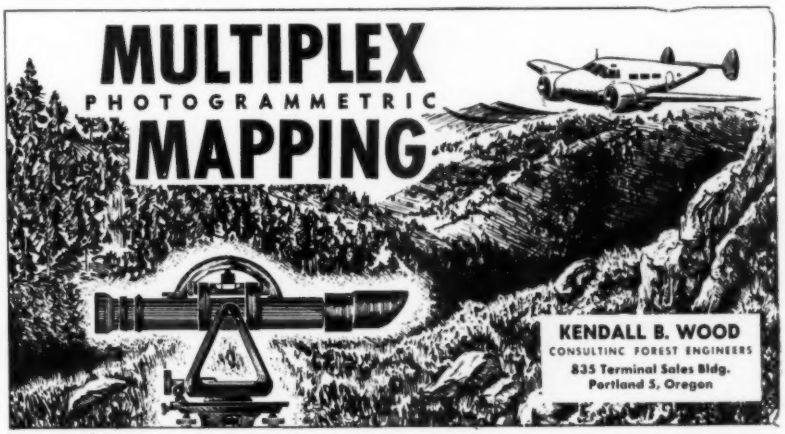

Hedgerows

(*From page* 449)

these trees is necessary to improve the productivity of the pasture.

When corn was grown on the south and west sides of hedge, it was often apparent to farmers that their crop had been reduced because of competition from hedgerows. They often overlooked the increased yield of corn on the north and east sides of the hedge due to windbreak benefits of the hedgerow.

A survey made during February of 1947 by the farm forester in Pawnee and Richardson counties of southeastern Nebraska, indicated there were over 2,000 miles of hedgerows in these two counties. It showed that over 130 miles had been destroyed by the pasturing of recently cut hedge and by burning and trimming back new sprouts; also that about thirty-five miles of hedgerows had been pushed out by bulldozers. In addition to this information, the survey found nearly 800 miles of mature hedge. These hedgerows contained an estimated 3,360,000 posts, worth $1,325,000.

A resurvey of the same area one year later disclosed that 103 more miles of hedgerows had been pushed out by bulldozers. Additional information in this latter survey showed that sixty-two miles of mature hedge had been cut for posts during the previous year, with an estimated value of $103,150.

Why are hedgerows being destroyed? Oftentimes hedgerows are interfering with new field boundaries or the proper location of a waterway. Perhaps a utility line is located over a hedgerow and the cost of maintenance is unreasonably high.

Another reason is that it is often difficult to maintain a wire fence where the wire has been strung through the trees. Osage-orange is thorny and a farmer's feeling towards a hedge of it is not always too pleasant.

For the past seventy years there has been continuous hedgerow destruction. Following the harvesting of the post crop, the tops were often piled on the stumps and burned. This method, however, seldom killed the roots but greatly reduced the vigor of the sprouts, causing a poor quality of hedgerow. Whenever a hedgerow within a pasture fence was cut, livestock browsed back the sprouts, often killing them. Repeated cutting of sprouts also eventually killed out much hedge.

Many hedgerows have been pulled out with farm machinery. Recently a large number of bulldozers began working in the farming area. Their principle source of income was in constructing dams and farm improvement work in accordance with Production Marketing Association and Soil Conservation Service farm plans. Pushing out hedgerows is an easy job for a bulldozer, and it takes but a few hours to clean up a quarter mile row. Many hedgerows have been destroyed because the bulldozer operator has an eye for business and is a convincing talker.

To the farm in the eastern Great Plains, a single row field windbreak is a valuable asset. Trees catch drifting snow and break the force of scorching summer breezes and drying winter winds. As a testimony to the protection given to the soil, one can see the ridge of silt which has collected at the base of most hedgerows.

In estimating the timber resource values of Great Plains states such as Nebraska and Kansas, the commercial value of the hedgerow is often overlooked. The owner of a good hedgerow knows he can usually cut 1000 posts in a quarter mile of hedge. And prices of posts in southeastern Nebraska have ranged from twenty cents, during the periods of depression, to forty cents for average quality posts. Large posts bring much more, and even stays, which are smaller than posts, bring as much as twenty cents on the present market.

The presence of a single row hedge means nesting sites, escape cover, and a source of food for wildlife. In southeastern Nebraska alone, the high quail population is attributed to the presence of hedgerows. When the hedgerows are removed, wildlife population will decrease.

In order to assist the farmer in determining whether his hedgerows are valuable and should be retained, a unique score card has been developed. To use it, the farmer needs only check whether a series of statements are "true" or "false." If his "true" score is highest the hedgerow should be retained; if the "false" score triumphs it would probably be well to remove the hedgerow and replace it with a new one on the contour as a field border.

When planted in a single row, osage-orange can be more easily managed as a crop than ordinary woodlands. In southeastern Nebraska, an established hedge requires about sixteen years to grow a fair-size fence post. A farmer owning a mile of hedge can arrange to cut a portion of it every winter—probably a quarter of a mile in four years. This would yield more posts than he would need on his own farm, and he would be able to store the surplus and have them handy for sale. Hedge posts are the most durable of any untreated posts in the midwest, lasting over forty years.

Each farmer interested in post production has his own method of growing good posts. When a hedgerow contains stems of satisfactory post size, it is ready for harvesting. Clear-cutting during the winter is the recommended practice. Where the hedgerow being cut is within a pasture, tops are often piled on the stumps. This protects new sprouts from livestock browsing and furnishes cover for wildlife.

Winter-cut stumps produce vigorous sprouts which grow two to six feet in height the following summer. It is a good practice to thin out poor sprouts between the third and fifth year, saving at least twelve thrifty stems a rod. Judicious side pruning will improve the quality of the posts if done several times during the immature stage. The trees should be protected from fire—also from browsing by livestock while the sprouts are small.

It is hoped that, with a better understanding of important hedge values—namely, wind protection, post production and wildlife cover, owners of hedge will be less hasty in destroying this resource which they have inherited.

AUTHORS

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The Purpose

The American Forestry Association is a national organization—educational in character—for the advancement of the intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation. Its purpose is (1) to bring about adequate protection and perpetuation of these resources by creating an enlightened public appreciation of the need of conserving them through wise use for the present and future welfare and enjoyment of all the people; (2) to make available to Americans in all walks of life a wider knowledge and appreciation of their forest resources and the part they can play in the social and industrial life of our nation.

The History MORE THAN half a century ago American men and women of vision, stirred by the rapid destruction of forests and forest life in the United States, began to raise their voices in behalf of conservation. Foreseeing the danger of allowing America's rich forests and vast natural wealth to be thoughtlessly wasted, these public-spirited individuals protested the needless destruction that was taking place. Out of their efforts came a collective force—The American Forestry Association, first organized in 1875 and made a national influence in 1882.

The Record THUS The American Forestry Association has a long record of efficient public service. The establishment of the United States Forest Service and the creation of the nationwide system of state and national forests and parks were due in no small part to the Association's efforts. Its educational work, extending over more than seventy years, has stimulated public action and built public support for protection against forest fires and floods; for prevention and control of soil erosion; for the development of conservation policies in forest management for continuous production through wise use; for the control of forest insects and diseases and the preservation of fish and wildlife.

The Support FROM AN ORGANIZATION of a few hundred members a half century ago, the Association has attained a substantial membership of many thousand men and women, living in every state of the Union and in foreign countries throughout the world. The funds of the Association are administered by a Board of Directors composed of individuals of national standing—men and women who give their services free, who have a practical understanding of the nation's present-day conservation needs, and are equipped through experience, ability, enthusiasm and training to advance the Association's program.

The Program BECAUSE OF its independent, non-political character, the work of The American Forestry Association is vitally necessary in the field of public service. It provides an unprejudiced influence for the development of sound conservation measures. It helps coordinate public, state and federal policies. It cooperates closely with federal, state and private agencies in conservation work. At the same time it initiates, sponsors and carries on needed projects in conservation in addition to its regular broad continuous program of education.

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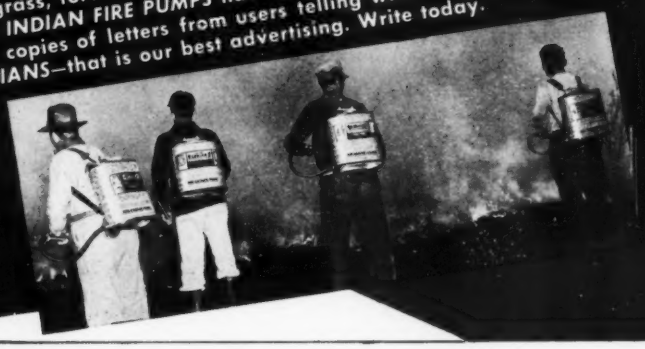

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